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PROCEEDINGS

OF THE

American Pharmaceutical Association

AT THE

THIRTY-SECOND ANNUAL MEETING,

HELD AT MILWAUKEE, WIS., AUGUST, 1884.

ALSO THE

CONSTITUTION, BY-LAWS, AND ROLL OF MEMBERS.



PHILADELPHIA:

PUBLISHED BY THE AMERICAN PHARMACEUTICAL ASSOCIATION.

1885.

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1884-85.

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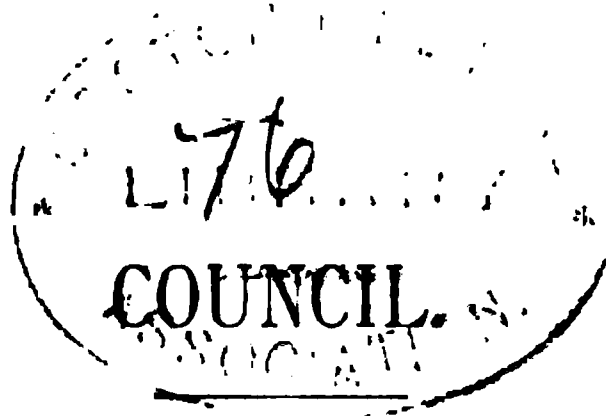
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S. J. BENDINER	New York, N. Y.
A. TSHEPPE	New York, N. Y.



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Term expires.

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"	WILLIAM SAUNDERS	London, Ont.
"	ALBERT E. EBERT	Chicago, Ill.
1886.	JOSEPH P. REMINGTON	Philadelphia, Pa.
"	GEORGE W. KENNEDY	Pottsville, Pa.
"	HENRY J. MENNINGER	Brooklyn, N. Y.
1887.	WILLIAM J. M. GORDON	Cincinnati, O.
"	JOSEPH L. LEMBERGER	Brooklyn, N. Y.
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GEORGE W. KENNEDY, Secretary.

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	C. F. GOODMAN,
	A. E. EBERT,
	THE TREASURER AND PERMANENT SECRETARY OF THE ASSOCIATION, <i>ex officio</i> .
<i>On Finance:</i>	SAMUEL A. D. SHEPPARD, Chairman.
	JOSEPH L. LEMBERGER,
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	JOHN M. MAISCH.
<i>On Centennial Fund:</i>	JOHN INGALLS, Chairman.
	S. A. D. SHEPPARD,
	JOHN M. MAISCH.

LIST OF OFFICERS OF THE ASSOCIATION,
SINCE ITS ORGANIZATION.

(*Deceased in Italics.*)

PRESIDENTS.

<i>Daniel B. Smith</i>	Philadelphia.	1852-53
William A. Brewer	Boston	1853-54
<i>William B. Chapman.</i>	Cincinnati.	1854-55
<i>John Meakim</i>	New York	1855-56
<i>George W. Andrews</i>	Baltimore	1856-57
<i>Charles Ellis</i>	Philadelphia	1857-58
<i>John L. Kidwell</i>	Georgetown, D. C	1858-59
Samuel M. Colcord	Boston	1859-60
<i>Henry T. Kiersted</i>	New York	1860-62
<i>William Procter, Jr.</i>	Philadelphia.	1862-63
J. Faris Moore	Baltimore	1863-64
William J. M. Gordon	Cincinnati.	1864-65
Henry W. Lincoln	Boston	1865-66
Frederick Stearns	Detroit, Mich	1866-67
<i>John Milhau</i>	New York	1867-68
<i>Edward Parrish</i>	Philadelphia.	1868-69
Ezekiel H. Sargent	Chicago.	1869-70
<i>Richard H. Stabler</i>	Alexandria, Va.	1870-71
Enno Sander	St. Louis	1871-72
Albert E. Ebert	Chicago.	1872-73
John F. Hancock.	Baltimore	1873-74
C. Lewis Diehl	Louisville, Ky	1874-75
George F. H. Markoe.	Boston	1875-76
Charles Bullock.	Philadelphia.	1876-77
William Saunders	London, Ont.	1877-78
Gustavus J. Luhn.	Charleston, S. C	1878-79
George W. Sloan	Indianapolis, Ind.	1879-80
James T. Shinn.	Philadelphia.	1880-81
P. Wendover Bedford.	New York	1881-82
Charles A. Heinitsh.	Lancaster, Pa	1882-83
William S. Thompson.	Washington, D. C	1883-84
John Ingalls	Macon, Ga	1884-85

FIRST VICE-PRESIDENTS.

<i>George W. Andrews</i>	Baltimore	1852-53
George D. Coggeshall.	New York	1853-54
Henry T. Cummings.	Portland, Me.	1854-55
Charles B. Guthrie	Memphis, Tenn	1855-56
<i>John L. Kidwell</i>	Washington, D. C.	1856-57

<i>James Cooke.</i>	Fredericksburg, Va.	1857-58
Edward R. Squibb	Brooklyn, N. Y.	1858-59
<i>William Procter, Jr.</i>	Philadelphia.	1859-60
William J. M. Gordon.	Cincinnati.	1860-62
<i>John Milhau.</i>	New York	1862-63
John M. Maisch	Philadelphia.	1863-64
<i>Richard H. Stabler.</i>	Alexandria, Va.	1864-65
George C. Close	Brooklyn, N. Y.	1865-66
<i>Edward Parrish.</i>	Philadelphia	1866-67
Robert J. Brown	Leavenworth, Kan.	1867-68
<i>Ferris Bringham.</i>	Wilmington, Del.	1868-69
Ferdinand W. Sennewald	St. Louis	1869-70
Fleming G. Grieve	Milledgeville, Ga.	1870-71
C. Lewis Diehl.	Louisville, Ky.	1871-72
Samuel S. Garrigues	East Saginaw, Mich.	1872-73
William Saunders.	London, Ont.	1873-74
Joseph Roberts.	Baltimore.	1874-75
Frederick Hoffmann	New York	1875-76
Samuel A. D. Sheppard.	Boston	1876-77
Ewen McIntyre	New York	1877-78
Frederick T. Whiting.	Great Barrington, Mass.	1878-79
T. Roberts Baker.	Richmond, Va.	1879-80
George H. Schafer	Fort Madison, Ia.	1880-81
Emlen Painter	San Francisco	1881-82
John Ingalls.	Macon, Ga.	1882-83
Charles Rice.	New York.	1883-84
John A. Dadd	Milwaukee, Wis.	1884-85

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Samuel M. Colcord.	Boston	1852-53
<i>Alexander Duval</i>	Richmond, Va.	1853-54
<i>John Meakim.</i>	New York	1854-55
<i>Charles Ellis</i>	Philadelphia.	1855-56
Frederick Stearns.	Detroit, Mich.	1856-57
<i>Samuel P. Peck.</i>	Bennington, Vt.	1857-58
<i>James O' Gallagher.</i>	St. Louis	1858-59
Joseph Roberts.	Baltimore.	1859-60
William S. Thompson.	Baltimore.	1860-62
<i>Eugene L. Massot</i>	St. Louis	1862-63
Charles A. Tufts	Dover, N. H.	1863-64
Enno Sander.	St. Louis	1864-65
<i>Elijah W. Sackrider.</i>	Cleveland, O.	1865-66
Ezekiel H. Sargent	Chicago.	1866-67
N. Hynson Jennings	Baltimore.	1867-68
Edward S. Wayne	Cincinnati.	1868-69
John H. Pope	New Orleans	1869-70
James G. Steele	San Francisco	1870-71
George F. H. Markoe.	Boston	1871-72
Edward P. Nichols	Newark, N. J.	1872-73
John T. Buck	Jackson, Miss.	1873-74
William T. Wenzell.	San Francisco	1874-75

T. Roberts Baker.	Richmond, Va.	1875-76
Gustavus J. Luhn.	Charleston, S. C.	1876-77
John Ingalls.	Macon, Ga.	1877-78
Henry J. Rose.	Toronto, Can.	1878-79
Joseph L. Lemberger.	Lebanon, Pa.	1879-80
William S. Thompson.	Washington.	1880-81
George Leis.	Lawrence, Kan.	1881-82
Louis Dohme.	Baltimore.	1882-83
Frederick H. Masi.	Norfolk, Va.	1883-84
Henry Canning.	Boston, Mass.	1884-85

THIRD VICE-PRESIDENTS.

<i>C. Augustus Smith</i>	Cincinnati.	1852-53
Charles B. Guthrie.	Memphis, Tenn.	1853-54
<i>Joseph Laidley</i>	Richmond, Va.	1854-55
<i>Henry F. Fish</i>	Waterbury, Conn.	1855-56
<i>Henry T. Kiersted</i>	New York.	1856-57
A. E. Richards.	Plaquemine, La.	1857-58
Robert Battey.	Rome, Ga.	1858-59
Edwin O. Gale.	Chicago.	1859-60
Theodore Metcalf.	Boston.	1860-62
J. Faris Moore.	Baltimore.	1862-63
<i>George W. Weyman</i>	Pittsburgh.	1863-64
<i>Thomas Hollis</i>	Boston.	1864-65
Charles A. Heinitsh.	Lancaster, Pa.	1865-66
John W. Shedden.	New York.	1866-67
<i>Daniel Henchman</i>	Boston.	1867-68
Albert E. Ebert.	Chicago.	1868-69
Joel S. Orne.	Cambridgeport, Mass.	1869-70
<i>Eugene L. Massot</i>	St. Louis.	1870-71
Matthew F. Ash.	Jackson, Miss.	1871-72
Henry C. Gaylord.	Cleveland, O.	1872-73
Paul Balluff.	New York.	1873-74
Augustus R. Bayley.	Cambridgeport, Mass.	1874-75
Christian F. G. Meyer.	St. Louis.	1875-76
Jacob D. Wells.	Cincinnati.	1876-77
Emlen Painter.	San Francisco.	1877-78
<i>William H. Crawford</i>	St. Louis.	1878-79
Philip C. Candidus.	Mobile, Ala.	1879-80
William Simpson.	Raleigh, N. C.	1880-81
John F. Judge.	Cincinnati.	1881-82
William B. Blanding.	Providence, R. I.	1882-83
Edward W. Runyon.	San Francisco.	1883-84
Charles F. Goodman.	Omaha, Neb.	1884-85

TREASURER.

Alfred B. Taylor.	Philadelphia.	1852-54
Samuel M. Colcord.	Boston.	1854-56
<i>James S. Aspinwall</i>	New York.	1856-57
Samuel M. Colcord.	Boston.	1857-59
<i>Ashel Boyden</i>	Boston.	1859-60

Henry Haviland	New York	1860-63
J. Brown Baxley	Baltimore	1863-65
Charles A. Tufts	Dover, N. H.	1865-85

RECORDING SECRETARIES.

George D. Coggeshall	New York.	1852-53
<i>Edward Parrish</i>	Philadelphia.	1853-54
Edward S. Wayne.	Cincinnati.	1854-55
William J. M. Gordon	Cincinnati.	1855-59
Charles Bullock	Philadelphia.	1859-60
James T. Shinn	Philadelphia.	1860-62
Peter W. Bedford.	New York.	1862-63
William Evans, Jr.	Philadelphia.	1863-64
Henry N. Rittenhouse	Philadelphia.	1864-65
John M. Maisch	Philadelphia.	1865-85

CORRESPONDING SECRETARIES.

<i>William Procter, Jr.</i>	Philadelphia.	1852-53
<i>William B. Chapman.</i>	Cincinnati.	1853-54
<i>William Procter, Jr.</i>	Philadelphia.	1854-57
<i>Edward Parrish</i>	Philadelphia.	1857-58
<i>Ambrose Smith</i>	Philadelphia.	1858-59
<i>William Hegeman</i>	New York	1859-60
Peter W. Bedford	New York	1860-62
John M. Maisch	Philadelphia.	1862-63
Peter W. Bedford	New York	1863-66

LOCAL SECRETARIES.

Peter Wendover Bedford	New York, N. Y.	1866-67
Alfred B. Taylor	Philadelphia, Pa.	1867-68
Henry W. Fuller.	Chicago, Ill.	1868-69
J. Faris Moore	Baltimore, Md.	1869-70
<i>William H. Crawford</i>	St. Louis, Mo	1870-71
Henry C. Gaylord	Cleveland, O.	1871-72
Thomas H. Hazard.	Richmond, Va.	1872-73
Emil Scheffer	Louisville, Ky.	1873-74
Samuel A. D. Sheppard.	Boston, Mass.	1874-75
Adolphus W. Miller	Philadelphia	1875-76
Henry J. Rose	Toronto, Can.	1876-77
Jesse W. Rankin	Atlanta, Ga	1877-78
Eli Lilly	Indianapolis, Ind.	1878-79
Charles F. Fish	Saratoga Springs, N. Y	1879-80
William T. Ford	Kansas City, Mo.	1880-81
Hiram E. Griffith.	Niagara Falls, N. Y	1881-82
Charles Becker	Washington, D. C	1882-83
Henry C. Schranck	Milwaukee, Wis	1883-84
George A. Kelly	Pittsburgh, Pa	1884-85

REPORTER ON PROGRESS OF PHARMACY.

C. L. Diehl	Louisville, Ky.	1873-85
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AUTHORIZED AGENTS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Appointed by the President, in compliance with the following resolutions:

Resolved, That the President be directed to appoint authorized agents, where needed in the different States, for the collection of dues, distribution of the Proceedings, etc.; such agents to be designated by the Treasurer and Permanent Secretary of the Association, and a list of the agents to be published in the Proceedings. (Passed at Baltimore, 1870.)

Resolved, That the President of this Association be requested to appoint, in every locality where more than three members reside, a local agent, whose duty it shall be to aid the Treasurer in the collection of members' dues in his section, and to procure new members by placing before the pharmacists, and others eligible to membership, the great advantages that they will derive from associating themselves with this body. (Passed at Indianapolis, 1879.)

Resolved, That while it is desirable that the authorized agents shall at all times render their accounts as promptly as convenient, it is especially to be desired that they render a complete account to the Treasurer, of such moneys as are in their hands on the first day of August and December in each year, in order that the Treasurer may be able to make his yearly accounts as full as possible. (Passed by Council, 1883.)


<i>Alabama,</i>	P. C. Candidus, cor. Dauphin and Cedar streets,	Mobile.
<i>Arkansas,</i>	Geo. W. Cabell, Congress and Bull streets,	Hot Springs.
<i>California,</i>	James G. Steele, 521 Montgomery street,	San Francisco.
<i>Colorado,</i>	Hugo R. Hartung, 230 Fifteenth street,	Denver.
<i>Dist. of Columbia,</i>	John A. Milburn, 1429 Pennsylvania avenue,	Washington.
<i>Connecticut,</i>	Charles A. Rapelye, 605 Main street,	Hartford.
	Alonzo F. Wood, 2 Church street,	New Haven.
	Luzerne I. Munson, Apothecaries' Hall,	Waterbury.
<i>Delaware,</i>	Linton Smith, cor. Seventh and Market streets,	Wilmington.
<i>Georgia,</i>	Theo. Schumann, Whitehall and Hunter streets,	Atlanta.
	Robert H. Land, 270 Broad street,	Augusta.
	John Ingalls, cor. Fourth and Poplar streets,	Macon.
<i>Illinois,</i>	Henry W. Fuller, 220 Randolph street,	Chicago.
	David G. Plummer, 6 Main street,	Bradford.
	Charles B. Allaire, 108 Main street,	Peoria.
<i>Indiana,</i>	Albert B. Buck,	Anderson.
	Henry J. Schlaepfel, Second and Main streets,	Evansville.
	George W. Sloan, 7 East Washington street,	Indianapolis.
	David Hilt, 84 Main street,	Lafayette.
	William C. Buntin, 600 Main street,	Terre Haute.
<i>Iowa,</i>	John W. Ballard, 106 West Second street,	Davenport.
	Theodore W. Ruete, 379 Main street,	Dubuque.
	Olaf M. Oleson, Market street,	Fort Dodge.

	George H. Schafer, 129 Front street,	Fort Madison.
	Silas H. Moore, 80 Fourth street,	Sioux City.
<i>Kansas,</i>	George Leis, 90 Massachusetts street,	Lawrence,
	Robert J. Brown,	Leavenworth.
<i>Kentucky,</i>	C. Lewis Diehl, cor. Third and Broadway,	Louisville.
	William H. Averill, 435 Main street,	Frankfort.
<i>Louisiana,</i>	Isaac L. Lyons, 42 Camp street,	New Orleans.
	Joseph T. Thibodeaux, Main street,	Thibodeaux.
<i>Maine,</i>	Noah S. Harlow, 4 Smith's Block,	Bangor,
	Edmund Dana, Jr., 373 Congress street,	Portland.
<i>Maryland,</i>	Robert Lautenbach, Eutaw and Saratoga streets,	Baltimore.
	Thomas W. Shryer, 103 Baltimore street,	Cumberland.
<i>Massachusetts,</i>	George M. Hoyt, 257 Columbus avenue,	Boston.
	Joel S. Orne, 493 Main street,	Cambridgeport.
	B. Frank Stacey, 51 Vine street,	Charlestown.
	Frederick T. Whiting, Main street,	Great Barrington.
	Freeman H. Butler, 141 Central street,	Lowell.
	Joseph W. Colcord, 153 Union street.	Lynn.
	Samuel O. Daniels, Main and Summer streets,	Natick.
	James E. Blake, 65 North Second street,	New Bedford.
	Joseph J. Estes, cor. Union and Church Streets,	Rockland.
	Thomas B. Nichols, 150 Essex street,	Salem.
	Charles P. Alden, 270 Main street,	Springfield.
	William Bush, 56 Front street,	Worcester.
<i>Michigan,</i>	Ottmar Eberbach, 12 South Main street,	Ann Arbor.
	Theodore Ronnefeld, 195 Gratiot street,	Detroit.
	Henry Melchers, Genesee and Jefferson streets,	East Saginaw.
<i>Minnesota,</i>	Karl Simmon,	St. Paul.
<i>Mississippi,</i>	Joseph W. Eckford, Commerce street,	Aberdeen.
	Matthew F. Ash,	Jackson.
<i>Missouri,</i>	James F. Hurt, Broadway,	Columbia.
	William T. Ford, 1305 Cherry street,	Kansas City.
	James M. Good, 2348 Olive street,	St. Louis.
<i>Nebraska,</i>	Charles F. Goodman, 180 Farnham street,	Omaha.
<i>Nevada,</i>	William A. Perkins, 213 Main street,	Virginia City.
<i>New Hampshire,</i>	Bayard T. Perry, 1088 Elm street,	Manchester.
	E. S. Russell, 69 Main street,	Nashua.
	Joseph H. Thatcher, 12 Market street,	Portsmouth.
<i>New Jersey,</i>	Albert T. Brown, cor. Fifth and Federal streets,	Camden.
	Jonathan B. Drake, 132 Broad street,	Elizabeth.
	Hermann Klusmann, Fourth street and Lafayette avenue,	Hoboken.
	Maxwell Abernethy, 188 Newark avenue,	Jersey City.
	Charles B. Smith, 831 Broad street,	Newark.
	Robert F. Parsons, 19 Main street,	Orange.
	Howard P. Reynolds, Front and Cherry streets,	Plainfield.
	G. A. Mangold, 4 East State street,	Trenton.
<i>New York,</i>	Charles H. Gaus, 202 Washington avenue,	Albany.
	G. C. Close, 67 Cumberland street,	Brooklyn.
	Charles O. Rano, 1872 Niagara street,	Buffalo.
	William L. DuBois, 281 Main street,	Catskill.
	James T. King, cor. Main and South streets,	Middletown.

	Daniel C. Robbins, 91 Fulton street,	New York.
	H. S. Sherwood, 339 Main street,	Poughkeepsie.
	G. H. Haass, 38 Main street,	Rochester.
	John G. Bissell, 45 Dominick street,	Rome.
	Charles F. Fish, 114 Broadway,	Saratoga.
	George Duryee, 191 State street,	Schenectady.
	Charles W. Snow, 28 East Genesee street,	Syracuse.
	William Blaikie, 202 Genesee street,	Utica.
<i>North Carolina,</i>	William Simpson, 33 Fayetteville street,	Raleigh.
	James C. Munds, Third street,	Wilmington.
<i>Ohio,</i>	Andrew M. Armstrong, 106 East Market street,	Akron.
	Walter H. Howson, Water street,	Chillicothe.
	J. U. Lloyd, N. W. cor. Court and Plum streets,	Cincinnati.
	Henry C. Gaylord, 110 Monument square,	Cleveland.
	Charles Huston, 43 South High street,	Columbus.
	Thomas J. Casper, 41 East Main street,	Springfield.
	Charles Hohley, 248 South street,	Toledo.
	Edgar M. Hatton, Fifth and Main streets,	Zanesville.
<i>Pennsylvania,</i>	Edward T. Myers, 16 Main street,	Bethlehem.
	Jacob A. Miller, cor. Second and Chestnut streets,	Harrisburg.
	Charles A. Heinitsh, 16 East King street,	Lancaster.
	Joseph L. Lemberger, 8 North Ninth street,	Lebanon.
	Francis W. Walker, Jr.,	New Brighton.
	Rich. M. Shoemaker, cor. Fourth and Race streets,	Philadelphia.
	James B. Cherry, 23 Fourth avenue,	Pittsburgh.
	Philip M. Ziegler, 526 Penn street,	Reading.
	Edward A. Cornell, Tenth and Pine streets,	Williamsport.
<i>Rhode Island,</i>	James M. Taylor, 104 Thames street,	Newport.
	Albert L. Calder, 163 Westminster street,	Providence.
<i>South Carolina,</i>	Gustavus J. Luhn, Post-office Box No. 582,	Charleston.
<i>Tennessee,</i>	Jas. S. Robinson, cor. Third and Madison streets,	Memphis.
	John C. Wharton, 38 Union street,	Nashville.
<i>Texas.</i>	Thomas W. Powell, 10 Houston street,	Fort Worth.
<i>Virginia,</i>	Frederick H. Masi, cor. Main and Granby,	Norfolk.
	T. Roberts Baker, 919 East Main street,	Richmond.
<i>West Virginia,</i>	Edwin L. Boggs, Kanawha Bank Building,	Charleston.
	Edmund Bocking, 3 Odd Fellows' Hall,	Wheeling.
<i>Wisconsin,</i>	Edward B. Heimstreet,	Janesville.
	John R. Drake, 255 South Water street,	Milwaukee.
<i>Prov. Nova Scotia,</i>	Francis C. Simson,	Halifax.
<i>Prov. Ontario,</i>	George Hodgetts, 305 Yonge street,	Toronto.
<i>Prov. Quebec,</i>	Henry R. Gray, 144 St. Lawrence Main street,	Montreal.

LIST OF QUERIES

TO BE ANSWERED AT THE THIRTY-THIRD ANNUAL MEETING, TO BE HELD AT
PITTSBURGH, PA., SEPTEMBER 8, 1885.

 Members intending to investigate one or more of the following subjects, or to present a volunteer paper at the next meeting, are requested to inform the Chairman of the Committee, J. U. Lloyd, Court and Plum streets, Cincinnati, O.

1. What is Commercial Oil of Cade?
2. What American drugs are exported, and in what amounts?
3. What advantage is there in coloring certain elixirs? for example, elixir of Valerianate of Ammonium?
4. It has been said that when Iodine Ointment is made by means of Petrolatum, the Iodine undergoes some change. What is the reaction?
5. What effect has the fungoid growth, which is a common development in dilute Phosphoric Acid and many other aqueous solutions, upon the acid, active principles, or other organic principles? To what extent will this growth depreciate the value of these solutions?
6. Syrup of the Phosphates of Iron, Quinine and Strychnine, made by the present U. S. P. process, undergoes a change, on standing. Can this be prevented and a permanent preparation made?
7. Is it desirable to replace the Sulphate of Quinine with the Bisulphate, or with the effloresced Sulphate?
8. Does the Bisulphate of Quinine of the market contain more Cinchonidine than the Sulphate?
9. What proportion of Menthol is present in the menthol pencils of the market?
10. Is Japan Menthol superior to that made of American Peppermint Oil?
11. What proportion of the Menthol of commerce is now imported?
12. Is it desirable that a Citrate of Iron and Quinine, containing Ammonia, be made officinal?
13. What is the proportion of Nitrous Ether in the officinal concentrated Nitrous Ether of the Pharmacopœia?
14. A preparation of commerce is now sold under the name of Concentrated Nitrous Ether. Is it possible to keep such a substance in order to prepare the spirit extemporaneously?

15. Does the Concentrated Spirit of Nitrous Ether, of the market, contain the amount of the Ether claimed for it?

16. Does the commercial Compound Spirit of Ether contain the Ethereal Oil as required by the Pharmacopœia?

17. Can not a more economical process than the officinal be suggested, for making Ethereal Oil?

18. A paper on the determination of Ethereal Oil is desirable.

19. What is the proper method for assaying Tincture of Opium, where the U. S. P. is the legal standard for drugs?

20. A paper on the qualities of commercial Oil of Lemon is desired.

21. Is there any difference in the laxative action of *Rhamnus Purshiana* and *Rhamnus Catharticus*?

22. Is American Ergot used to any extent?

23. What are the Scale Pepsins of commerce?

24. Does Brucine of commerce contain Strychnine?

25. What is the per centage of Caustic Alkali (KOH) in the stick Caustic Potash of commerce?

26. Is Wood Alcohol substituted for alcohol by any who prepare Pharmaceuticals?

27. What is generally sold under the label, "English Calomel?"

28. Is Calomel made in England superior in any way to that of our manufacturers?

29. A paper on the best practical method to determine melting points is desired.

30. What is the difference between white and red Oil of Thyme?

31. A good process for determining Tannic Acid.

32. Some remarks are desired on the distillation of water by pharmacists in order to meet the Pharmacopœial requirements. Also a description of the various forms of distilling apparatus, with notes on their merits or defects.

33. Some notes concerning the Carbolic Acid made in America.

34. How does the Glycerin of commerce conform to the requirements of the Pharmacopœia?

35. What is the chemical relation, if any, between the Oils of Peppermint and Spearmint?

36. Remarks on the elixir of Citrate of Hydrastine and Ammonio-citrate of Bismuth.

37. On Copalchi Bark.

38. A paper on the tests for Brucine in the presence of Strychnine, and for Strychnine in the presence of Brucine, is desirable. Also a plan for the perfect separation of the alkaloids.

39. Can the present U. S. P. process for the preparation of Diachylon Ointment be improved upon? If so, suggest a better.
40. What is the best method of preserving Mucilage of Acacia?
41. In the preparation of Oleates, which produces the most satisfactory products, oleic acid or soap?
42. An examination of the Spanish Saffron of commerce.
43. What is used to adulterate beeswax, and what is the quality of the Yellow Beeswax of commerce?
44. Is the formula of our Pharmacopœia for making solution of Nitrate of Iron satisfactory? Will the preparation keep?
45. Will the Chloroform of commerce conform to the requirements of the U. S. P.?
46. Is pure Oleic Acid, for the preparation of Oleates, equal to an acid which contains a portion of Stearic Acid?
47. Are commercial Volatile Oils adulterated to any extent?
48. Commercial Oil of Male Fern deposits a sediment. Is the sediment or the overlying oil the desirable portion?
49. What proportion of the Cinchona Barks of commerce, will answer the Pharmacopœial tests?
50. Mixtures of Elixir of Calisaya and Citrate of Iron vary in color and appearance. A paper on the subject is desired.
51. Are the Compound Cathartic Pills of commerce prepared in accordance with the U. S. P.?
52. Can a process be suggested to prevent lead plaster and plasters made from lead plaster from hardening and becoming brittle?
53. A paper on the solubility of Berberine.
54. What is the chemical nature of the acrid principle of Mezereon bark?
55. Is Brucine poisonous?
56. What is the nature of the crystalline precipitate that forms in Tincture of Boletus Laricis?
57. What menstruum is best adapted to extract and hold in solution the desirable principles of Licorice Root?
58. What is the quality of the narcotic herbs of commerce?
59. The source and supply of indigenous drugs.
60. What should be the relation between wholesale druggists, manufacturing chemists, and pharmacists and dispensing pharmacists, as to the maintenance of proper standards of purity, quality and strength of medicinal substances?
61. Is it proper to prepare tinctures, wines, syrups, decoctions, infusions, etc., from fluid extracts; and if so, to what extent?

62. A paper on Sassafras Camphor.
63. What is the quality of the Belladonna Leaves of commerce?
64. What is the quality of the Cannabis Indica of commerce? Will it make a green tincture, U. S. P.?
65. What is the quality of the solid extract of Cannabis Indica of commerce?
66. Is the green colored extract of Cannabis made of the imported herb?
67. Report on commercial Chloric Ether.
68. What is the quality of commercial Tartar Emetic?
69. Report on the commercial scale Salts of Iron.
70. What is the active principle of Arnica?
71. A paper on the Creasotes of commerce is desired.
72. What is the average quality of the Cod Liver Oil of commerce?
73. Would it not be desirable to make some of the medicated waters of the Pharmacopœia by distillation from the drug instead of from the oils?
74. What is commercial Musk?
75. Does Cannabis Indica contain Nicotine?
76. A paper on the bitter principle of Anthemis nobilis is desired.
77. What is the quality of the Balsam of Tolu of commerce?
78. What amount of sand is present in commercial Asafoetida? A comparison of different specimens is desired.
79. Report on the quality of the Cacao Butter of commerce.
80. What proportion of the Olive Oil of commerce is olive oil?
81. Is pure Olive Oil superior for table use to fixed Oil of Mustard (now largely bottled and sold for table purposes)?
82. How can Permanganate of Potassium pills best be prepared? Give experiments with excipients.
83. A paper on the quality of the ready-made Permanganate of Potassium pills of commerce is desired.
84. What is Black Antimony of commerce?
85. What is the difference in value between Crude Iodine and Resublimed Iodine?
86. A paper on the preparation of Nitrate of Silver pills is desired.
87. Is Glucose substituted in the preparation of commercial medicated syrups?
88. What is the most desirable melting point for Petrolatum?
89. What are the contaminations of commercial Salicylic Acid?

90. When Salicylic Acid is made by decomposing Oil of Wintergreen with Caustic Potash, a volatile substance escapes, having the exact odor of a volatile body that escapes from fresh willow bark. What is this?

91. What is the best paste for labelling bottles, and how can paste be best preserved?

92. What proportion of soil adheres to commercial indigenous roots?

93. What proportion of Fusel Oil is present in commercial alcohol?

94. Is Calomel incompatible with Chloral Hydrate? It has been suggested that a soluble mercury compound may, under certain conditions, be formed.

AMENDMENTS TO THE BY-LAWS.

TO BE ACTED ON AT THE 33D ANNUAL MEETING.

Motion of Mr. Ebert (see page 532) to amend Chapter IV. (Of the Treasurer), Article IV., by changing the figures 500 to 600—so as to read :

“ARTICLE IV. He shall present a statement of his accounts at each Annual Meeting of the Council, that they may be audited ; he shall receive an annual salary of \$600, and the amount of his expenses incident to the meeting in addition to his salary.”

As directed by the Association (see page 510) the Council prepared an amendment to Chapter IX. (Of Meetings) relating to business not of a scientific character, as an addition to Article IV. (see page 541). At a Council meeting held December 30, 1884, this action was reconsidered, and it was decided to recommend striking out the present Art. IV. which reads :

“ARTICLE IV. The order of business at subsequent sessions shall be determined by the Council, with the consent of the Association.”

And adopting the following :

“ARTICLE IV. At each subsequent session, except such as may be held for specific purposes, after the expiration of one hour from the appointed time of meeting, the report of the Committee on Papers and Queries shall be called, and no other business shall be considered, unless by a vote of three-fourths of the members present and voting thereon.”

CONTENTS.

	PAGE.
Prefatory Notice	20
List of Members present at the Thirty-second Annual Meeting	22
REPORT ON THE PROGRESS OF PHARMACY.	
Introduction	25
Pharmacy : A. Apparatus and Manipulation	31
B. Preparations	47
Materia Medica : A. Vegetable Drugs	118
B. Animal Drugs	202
Inorganic Chemistry	205
Organic Chemistry	246
REPORTS OF COMMITTEES.	
Report of the Committee on the Drug Market. By M. N. Kline	348
Statistics from Port of Boston. By E. W. Cutler	360
Report of Committee on Legislation	364
Pharmacy Act of Ohio	367
Pharmacy Act of New York State	370
Pharmacy Law of Erie County, N. Y.	372
Pharmacy Law of Milwaukee of 1882	377
Report of Committee on Exhibition	379
SPECIAL REPORTS AND ESSAYS.	
I. Pharmacy :	
A set of Standard Dimensions for Simple Percolators. By Oscar Oldberg	388
Simultaneous Fractional Percolation, with notes on some Fluid Extracts. By C. S. Hallberg.	392
A Study of Percolation. Review and Critique. By H. T. Cummings, M. D.	398
Precipitates in Fluid Extracts. By J. U. Lloyd	410
Emulsion of Balsam Copaiba with Tincture of Muriate of Iron. By C. W. Phillips	419
Pepsau. By Henry Biroth	420
Prevention of Brittleness in Plasters. By Hugo W. C. Martin	421
A New Poison Case. By Henry Biroth	422
Cleanliness in Pharmacy. By J. G. C. Simms	426
Manufacturers' Preparations Ordered in Prescriptions. By Otto A. Wall, M. D., Ph. D.	428
II. Chemistry :	
Microscopical Examination of Fungous Deposit in Acidum Phosphoricum Dilutum. By Samuel G. Ade	432
On Commercial Bromide of Potassium. By Prof. Virgil Coblentz	433
Mercurous and Mercurioso-mercuric Iodides. By Henry MacLagan	442
On Cream of Tartar sold by Pharmacists and by Grocers. By George W. Kennedy	445
On Hydrastine. By Prof. Fred. B. Power, Ph. D.	448
On Water of Hydration in Commercial Sulphate of Quinine. By Henry B. Parsons	457
The Practicability of Kerner's Test. By Henry B. Parsons	458
Modification of Kerner's Test. By Henry MacLagan	461
III. Materia Medica :	
Canutillo. By J. W. Colcord.	462
Rhubarb: its history, habitat, culture, etc. By J. W. Colcord	463
On Artificial Oil of Gaultheria. By Adolph W. Miller, M. D.	473
Note Relating to U. S. P. Cinchona Assay. By Edward Goebel	474
On Opium Assays. By Wm. W. Bartlet	475
MINUTES OF THE THIRTY-SECOND ANNUAL MEETING.	
Minutes of the First Session :	
Address by Hon. Emil Walber, Mayor	478
Annual Address, by President Thompson	479

Invitation Extended; Report on Delegations	486
Appointment of Nominating Committee	487
Minutes of Council.	488
Report of Committee on Membership	489
Report of the Publishing Committee.	493
Report on the Alleged Sale of Condemned Drugs by the Government	495
Committee on Exhibits and on the President's Address Appointed	497
Minutes of the Second Session :	
Report of Nominating Committee.	497
Election of Officers and Standing Committees; Invitations Received	498
Installation of Officers	499
Remarks by Delegates from National Wholesale Druggists' Association.	500
Minutes of Council; Election of Members; Exhibition of Proprietary Medicines	501
Report of the Special Committee on Meeting in California	502
Discussion of Report; Committee on Next Meeting Appointed.	504
Report of Committee on Prize Essays; Communication from Wisconsin Pharmaceutical Association.	505
Report of Committee on Unofficial Formulas.	506
Minutes of the Third Session :	
Minutes of Council.	507
Organization of Council; Members Elected; Committees Appointed; Report on Papers and Queries	508
Time and Place of the Next Annual Meeting decided upon; Closing of Exhibition Room	509
Resolution Relating to General Business; Paper on Opium Assays read and discussed.	510
Paper on Hydrastine read and discussed.	511
Paper on Canutillo read and discussed.	516
Paper on Fungoid Growth in Phosphoric Acid read and discussed.	517
Minutes of the Fourth Session :	
Minutes of Council; Members Elected; Report of Committee on President's Address.	518
Paper on Standard Dimensions of Percolators read and discussed	521
Papers read; Committee to visit National Wholesale Druggists' Association	523
Report of Treasurer	524
Discussion on Appropriation for Examination of Drugs and Chemicals	526
Resolution relating to Proprietary Medicines, Committee appointed	528
Minutes of the Fifth Session :	
Minutes of Council; Election of Members	528
Report of Entertainment Committee	529
Committee on Entertainments; Amendments to the By-Laws; Discussion on keeping of Poisons	532
Resolutions of Thanks; Invitation received; Papers read	537
Paper on Precipitates in Fluid Extracts discussed	538
Papers read; Local Secretary elected	540
Adjournment	541

APPENDIX.

Amendment to the By-Laws prepared by Council; Entertainments	541
List of Colleges and Associations Accrediting Delegates	542
List of Publications Received	544
List of Societies, etc., Receiving Complimentary Copies	545
Constitution and By-Laws of the American Pharmaceutical Association	548
By-Laws of the Council	557
Form of Application for Membership	560
Roll of Members	561
Alphabetical List of Members	584
List of Deceased Members	610
List of Resignations	616
INDEX	617

PREFATORY NOTICE.

THE last portion of the manuscript reached the editor early in December, and shortly afterwards the arrangements for printing and publishing of the Proceedings were completed. Only a small number of the wood cuts were made at the expense of the Association, the remainder having been loaned by the publishers of the "American Druggist," the "American Journal of Pharmacy," and the "Pharmaceutical Record," and those published with the papers on "Percolators" and on "Precipitates in Fluid Extracts" were furnished by Prof. Oldberg and Prof. Lloyd. The General Index for the volumes of 1871 to 1882 inclusive, which was printed in 1884, is bound with the present volume.

The portrait of Daniel B. Smith, the first President of the American Pharmaceutical Association, has been selected by the Council as the frontispiece of the present volume. Mr. Smith was born in Philadelphia, July 14, 1792, and died in the same city, March 29, 1883, in the ninety-first year of his age. He learned the drug business in his native city, and was in business there for many years. He was an original member of the College of Apothecaries, and was elected its first Secretary in 1821, the institution being in the following year incorporated as the Philadelphia College of Pharmacy, of which Mr. Smith was President from 1829 to 1854. A biographical sketch of Mr. Smith will be found on page 431 of the "Proceedings" for 1883.

The prices of the several issues of the Proceedings now on hand, *including postage*, are :

	Unbound.	Bound.
1851, 1852, 1853, 1854, 1855, each	\$0 25	
1857,	50	\$0 80
1858,	1 50	1 75
1859,		1 75
1860,		1 25
1862, 1863, each		1 50
1864, 1865, 1866, each	1 50	1 80
1867,	2 20	2 50
1868, 1869, 1870, each	2 50	3 00
1871,	4 50	5 25
1872,	2 50	3 00
1873, 1874, each	5 00	5 50
1875, 1876, each	7 00	7 50
1877,	6 00	6 50
1878, 1879, each	7 00	7 50

	Unbound.	Bound.
1880,	6 00	6 50
1881,	5 50	6 00
1882,	6 00	6 50
1883,	5 00	5 50
1884,	5 50	6 00

1856 out of print; none published in 1861.

The following sets are offered, *exclusive of postage or express charges*:

The first six in paper, the remaining volumes bound.	\$79 00
Volumes 1859 to 1863, inclusive, bound, the others in paper covers	69 50
The bound volumes, as above, up to 1875, inclusive	30 00
The bound volumes, as above, up to 1872, inclusive	20 00
In paper covers, as above, up to 1875, inclusive	26 00
In paper covers, as above, up to 1872, inclusive	18 00

All orders for Proceedings should be addressed to the Permanent Secretary, John M. Maisch, 143 North Tenth street, Philadelphia, Pa.

The price of the nickel badge has been reduced by vote of the Council to 25 cents, on receipt of which sum by the Permanent Secretary, the badge will be sent by mail.

The Thirty-third Annual Meeting will be held in Pittsburgh, Pa., on the second Tuesday (8th day) of September, 1885, at 3 o'clock, p. m. Blank applications for membership may be obtained from the authorized agents or from the Permanent Secretary. Applications properly filled should reach the chairman of the Committee on Membership, George W. Kennedy, Pottsville, Pa., on or before September 1st; if sent later they should be addressed to the care of the Local Secretary, George A. Kelly, Pittsburgh, Pa. The fees should be sent by postal money order, by draft or by bank-check.

The readers are requested to correct a typographical blunder on page 527, line 9 from top. The sums mentioned there should be "between \$150 and \$200."

LIST OF MEMBERS, DELEGATES, AND OTHERS IN ATTENDANCE AT THE THIRTY-SECOND ANNUAL MEETING.

Names of Delegates are indicated by an asterisk. (*)

Frank Abbott, Milwaukee, Wis.
M. W. Alexander, St. Louis, Mo.
*H. J. Alfreds, Providence, R. I.
J. H. Andrews, Seymour, Ind.
*W. W. Bartlet, Boston, Mass.
C. R. Bechman, Fountain City, Wis.
P. W. Bedford, New York, N. Y.
J. S. Bennett, Philadelphia, Pa.
*W. H. Bergman, Washington, D. C.
*H. Biroth, Chicago, Ill.
*E. Bocking, Wheeling, W. Va.
*R. J. Brown, Leavenworth, Kan.
*W. C. Buntin, Terre Haute, Ind.
*M. L. Byers, Hagerstown, Md.
*J. W. Caldwell, Detroit, Mich.
H. W. Campbell, New York, N. Y.
P. C. Candidus, Mobile, Ala.
*H. Canning, Boston, Mass.
S. L. Coffin, Chicago, Ill.
*J. W. Colcord, Lynn, Mass.
J. Colgan, Louisville, Ky.
*A. Conrath, Milwaukee, Wis.
T. P. Cook, Philadelphia, Pa.
R. H. Cowdrey, Chicago, Ill.
*R. W. Crawford, Fort Dodge, Ia.
F. M. Crolus, Milwaukee, Wis.
*J. A. Dadd, Milwaukee, Wis.
C. W. Day, Springfield, Ill.
*C. L. Diehl, Louisville, Ky.
P. L. Dohmen, Milwaukee, Wis.
J. R. Drake, Milwaukee, Wis.
C. L. Eberle, Philadelphia, Pa.
H. T. Eberle, Watertown, Wis.
*A. E. Ebert, Chicago, Ill.
*J. W. Eckford, Aberdeen, Miss.
J. C. Elfers, Cincinnati, O.
*L. Eliel, South Bend, Ind.
H. W. Fuller, Chicago, Ill.
G. Gacz, Milwaukee, Wis.

M. Gessler, Milwaukee, Wis.
*J. M. Good, St. Louis, Mo.
T. T. Goodale, Boston, Mass.
*C. F. Goodman, Omaha, Neb.
W. J. M. Gordon, Cincinnati, O.
*J. Greyer, Cincinnati, O.
*G. Gundrum, Ionia, Mich.
G. O. Guy, Chicago, Ill.
C. S. Hallberg, Chicago, Ill.
*J. H. Harrison, Davenport, Ia.
*H. F. Hassebrock, St. Louis, Mo.
*C. A. Heinitsh, Lancaster, Pa.
L. Heller, Chicago, Ill.
W. F. Henes, Chicago, Ill.
*F. W. Herbst, Columbus, O.
F. Hoffmann, New York, N. Y.
A. H. Hollister, Madison, Wis.
J. J. Hovekamp, Cincinnati, O.
J. C. Huber, Fond du Lac, Wis.
*J. N. Hurty, Indianapolis, Ind.
C. Huston, Columbus, O.
*J. Ingalls, Macon, Ga.
J. Jesson, Muskegon, Mich.
C. B. Johnson, Middletown, O.
J. R. Jones, Mankato, Minn.
*G. W. Kennedy, Pottsville, Pa.
H. Kienth, Milwaukee, Wis.
*L. Klayer, Cincinnati, O.
M. N. Kline, Philadelphia, Pa.
*G. Koch, St. Louis, Mo.
*N. A. Kuhn, Omaha, Neb.
*E. W. Lancaster, Marshall, Tex.
J. L. Lemberger, Lebanon, Pa.
*J. U. Lloyd, Cincinnati, O.
J. C. Loomis, Jeffersonville, Ind.
*C. Ludlow, Springfield, O.
*G. McDonald, Kalamazoo, Mich.
W. McIntyre, Philadelphia, Pa.
D. T. MacDonald, Calumet, Mich.

G. MacKimmie, Detroit, Mich.
 *T. J. Macmahan, New York, N. Y.
 *T. F. Main, New York, N. Y.
 J. M. Maisch, Philadelphia, Pa.
 E. Martin, Indianapolis, Ind.
 *A. Mayell, Cleveland, O.
 H. S. Maynard, Chicago, Ill.
 H. J. Menninger, Brooklyn, N. Y.
 *A. H. Merrell, Cincinnati, O.
 C. F. G. Meyer, St. Louis, Mo.
 A. C. Nagle, Youngstown, O.
 A. Nattans, Washington, D. C.
 G. A. Newman, Louisville, Ky.
 O. Oldberg, Chicago, Ill.
 *J. S. Orne, Cambridgeport, Mass.
 H. B. Parsons, New York, N. Y.
 *T. H. Patterson, Chicago, Ill.
 J. F. Patton, York, Pa.
 H. J. Penfold, Angola, N. Y.
 *E. C. Pfingst, Louisville, Ky.
 W. P. Plummer, Bradford, Ill.
 H. C. Porter, Towanda, Pa.
 F. B. Power, Madison, Wis.
 *F. F. Prentice, Janesville, Wis.
 *H. H. Rademaker, Louisville, Ky.
 *J. P. Remington, Philadelphia, Pa.
 F. J. Renz, Louisville, Ky.
 *A. Robbins, Philadelphia, Pa.
 *F. Robinson, Kenosha, Wis.
 *W. H. Rogers, Middletown, N. Y.
 T. Ronnefeld, Detroit, Mich.

J. B. Ruble, Canton, Ill.
 *E. Sander, St. Louis, Mo.
 *E. H. Sargent, Chicago, Ill.
 *E. A. Sayre, Brooklyn, N. Y.
 *L. E. Sayre, Philadelphia, Pa.
 *G. H. Schafer, Fort Madison, Ia.
 A. Scherer, Chicago, Ill.
 H. C. Schranck, Milwaukee, Wis.
 H. Schroeder, Quincy, Ill.
 *E. Schueller, Columbus, O.
 *G. J. Seabury, New York, N. Y.
 F. L. Senier, Milwaukee, Wis.
 *F. W. Sennewald, St. Louis, Mo.
 *E. A. Siegemund, Boston, Mass.
 K. Simmon, St. Paul, Minn.
 *G. W. Sloan, Indianapolis, Ind.
 *N. A. Stanford, Florence, Kan.
 W. P. Thackeray, Davenport, Ia.
 *W. S. Thompson, Washington, D. C.
 J. J. Thomsen, Jr., Baltimore, Md.
 F. M. Tiernan, Roselle, N. J.
 *C. A. Tufts, Dover, N. H.
 *J. G. Underhill, Brooklyn, N. Y.
 A. G. Vogeler, Chicago, Ill.
 O. C. Weinman, New York, N. Y.
 *J. D. Wells, Cincinnati, O.
 *L. H. Wheeler, Albany, N. Y.
 *T. Whitfield, Chicago, Ill.
 J. H. Wilson, Chicago, Ill.
 L. Woltersdorf, Chicago, Ill.

PROCEEDINGS
OF THE
THIRTY-SECOND ANNUAL MEETING
OF THE
American Pharmaceutical Association.

REPORT ON THE PROGRESS OF PHARMACY

FROM JULY 1, 1883, to JUNE 30, 1884.

BY C. LEWIS DIEHL.

The meeting of the Association, being held so much earlier than is customary, and the circumstance that the "Reporter on the Progress of Pharmacy," by reason of illness, was incapacitated for work for a period of nearly four months, prevents the presentation of the completed report at this time. Nevertheless, it is hoped that the report will be completed and in the hands of the Secretary in time for the publication of the "Proceedings," and that these will not be delayed on this account.

The arrangement of the report will be the same as in previous years, and it will be found a satisfactory exponent of pharmaceutic progress during the period covered by it. It has been the constant aim of the reporter to make the report as complete as possible, and to omit nothing that might be considered of value for future reference. Among the subjects that have engaged his attention in recent years, but for which he has hitherto not found the proper place, a brief synopsis of the work of the different State Pharmaceutical Associations seems to him to merit consideration in this report. Ten years ago there were in existence only four State Pharmaceutical Associations, and only two of these could properly claim to be representative associations of pharmacists of the states whose names they bore. To-day we can count at least thirty-one state associations, a majority of which, indeed, have entered into existence within

the past five years. As near as could be ascertained, these associations were organized in about the following chronological order:

California	1868	North Carolina	1879
New Jersey	1869	Iowa	1879
Mississippi	1869	Illinois	1879
New Hampshire	1873	Kansas	1880
Rhode Island	1875	Wisconsin	1880
Vermont	1875	Alabama	1881
Tennessee	1875	Missouri	1881
Maine	1876	Virginia	1881
South Carolina	1876	West Virginia	1882
Georgia	1876	Indiana	1882
Connecticut	1876	Louisiana	1882
Kentucky	1877	Massachusetts	1882
Pennsylvania	1878	Maryland	1883
New York	1879	Michigan	1883
Texas	1879	Arkansas	
Ohio	1879		

The children, so to speak, of the American Pharmaceutical Association, the State Associations, have become a power in the land, and their influence is being felt very decidedly in the deliberations of this Association. In the beginning, their transactions, as a matter of course, were simply legislative or administrative; as they became stronger, however, scientific work and discussions became, as was contemplated in their organization, an important feature of the meetings, and this has provided no small contingent to the current pharmaceutic literature. It is therefore believed that the embodiment of a synopsis of the work of these associations on the field of pharmaceutic science will not alone prove a welcome addition to this report, but in itself give evidence of such progress as is made from year to year by American pharmacists. It is a matter of regret, however, that the material at the command of the reporter does not enable him to give a complete synopsis of the work done, and he therefore earnestly requests the Secretaries of the different State Associations to furnish him, as soon as possible after the meetings, with a brief synopsis of the transactions of their respective Associations; or, if this is not convenient, with a printed copy of the "Proceedings" as soon as issued. The following synopsis, also, is liable to contain some errors, from the fact that, except in a few instances, the facts had to be culled from the current pharmaceutical journals. The arrangement is in the order of the dates of the meetings.

New Hampshire Pharmaceutical Association.—Tenth Annual Meeting at Concord, October 9, 1883. President, Frank H. Chapman, Franklin Falls; Secretary, Geo. F. Underhill, Concord. A "Report on the Pro-

gress of Pharmacy" was made by W. P. Underhill, embracing the following subjects: Pepsin; General Rules for Dispensing, Pill-making, Tincture of Rhubarb, Acid Phosphates, Wine of White Ash, Glucose, Pharmaceutical Preparations of Corn Silk. Robert C. Dickey read a paper on "Fluid Extracts," and Charles A. Smith a paper on "Emulsions." The Association meets next at Lancaster.

Illinois Pharmaceutical Association.—Fourth annual meeting at Springfield, October 9 and 10, 1883. President, H. LeCaron, Braidwood; Secretary, T. H. Patterson, Chicago. Several papers were read. The Association meets next at Bloomington, on the last Tuesday of September, 1884.

Missouri Pharmaceutical Association.—Fifth annual meeting at St. Louis, October 23, 24, and 25, 1883. President O. A. Wall, St. Louis; Secretary, G. H. Charles Klie, St. Louis. The following papers were read: "Articles Dismissed from the Pharmacopœia," by J. M. Good; "Spurious Star Anise," by O. A. Wall; "Spurious Male Fern," by O. A. Wall; "Artificial Production of Cold and Ice," by C. O. Curtman; "The Importance of the Vegetable Materia Medica," by O. Oldberg; "Syrup of Orange Peel," by F. W. Sennewald; "On Kairin," by G. H. Charles Klie. The Association adjourned to meet at Brownsville, in June, 1884.

Michigan Pharmaceutical Association.—The meeting for organization was held at Lansing, November 14 and 15, 1883. President, Frank Wells, Lansing; Secretary, Jacob Jesson, Muskegon. The Association meets next at Detroit, on the second Monday in September, 1884.

South Carolina Pharmaceutical Association held its annual meeting at Columbia, November 15, 1883. President, H. Baers, Charleston; Secretary, P. Wineman, Charleston.

California Pharmaceutical Association held its annual meeting at San Francisco, January 13, 1884.

Connecticut Pharmaceutical Association.—Eighth annual meeting at New Haven, February 5 and 6, 1884. President, W. R. Francis, New Haven; Secretary, F. Wilcox, Waterbury. The Association meets next at Hartford, date to be decided.

Georgia Pharmaceutical Association.—Ninth Annual meeting at Macon, April 8, 1884. President, S. C. Durban; Secretary, I. Zacharias. The following papers were read: "Are we on the Retrograde?" by R. H. Land; "Why Retail Druggists do not make more of the Preparations they use," by N. I. Brunner; "Syrup of Ipecac," by S. C. Durban. The Association next meets at Atlanta, April 14, 1885.

Arkansas Pharmaceutical Association.—Second Annual Meeting at Little Rock, April 29, 1884. President, J. B. Bond, Little Rock; Secretary, J. R. Colburn, Little Rock.

Maryland Pharmaceutical Association.—Second Annual Meeting at Baltimore, May 12, 1884. President, D. C. Auginbaugh, Hagerstown; Secretary, M. L. Byers, Hagerstown. The following papers were read: "Modern Pharmacy," by J. F. Hancock; "Syrup," by Charles Caspari, Jr.; "Hydrobromic Acid," by W. S. Thompson; "Elixir of Gentian and Chloride of Iron," by M. R. Culbreth; "New Pharmacy and Pharmacists," by J. R. Roberts; "Volumetric Solutions," by Charles Caspari, Jr.; "New Nomenclature, Pharm. 1880," by Wm. Simon; Modern Pharmacy, and Its Kindred Branches," by A. P. Sharp. The Association meets next at Hagerstown.

Indiana Pharmacutical Association.—Third Annual Meeting at Evansville, May 13, 14 and 15, 1884. President, W. L. Johnston, Evansville; Secretary, Jos R. Perry, Indianapolis. The following papers were read: "Pill-Coating," "Pharmaceutical Use of Starch," "Errors in Prescriptions," "Quality of Spiritus Frumenti," "Percolators," "Petroleum Ointment," etc.

Alabama Pharmaceutical Association.—Third Annual Meeting at Montgomery, May 13, 1884. President, P. C. Candidus, Mobile; Secretary, M. M. Stone, Selma.

Texas Pharmacutical Association.—Fifth Annual Meeting at Waco, May 13, 14 and 15, 1884. President, E. M. Wells, Fort Worth; Secretary, J. H. Bradley, Taylor. The Association meets next at San Antonio during the spring of 1885.

Nebraska Pharmaceutical Association held its Annual Meeting at Omaha, May 14, 1884. President, Norman A. Kuhn, Omaha; Secretary, H. H. Whittlesey, Crete. Several practical papers were read and discussed. The Association meets next at Omaha, on the 13th of May, 1885.

Louisiana Pharmaceutical Association.—Second Annual Meeting at Baton Rouge, May 19, 1884. President, R. N. Girling, New Orleans; Secretary, Ben Lewis, New Orleans. Several papers were read. The Association meets next at New Orleans during April or May, 1885.

Mississippi Pharmaceutical Association held its Annual Meeting at Aberdeen, May 20, 1884. President, J. W. Eckford, Aberdeen; Secretary, H. F. West, Fayette. Next meeting at Natchez.

Virginia Pharmaceutical Association.—Third Annual Meeting at Lynchburg, May 20, 1884. President, W. A. Strother, Lynchburg; Secretary, E. R. Beckwith, Petersburg. The Association meets next at Charlottesville.

New Jersey Pharmaceutical Association held its Annual Meeting at Asbury Park, May 21 and 22, 1884. President, Albert P. Brown, Camden; Secretary, R. H. Vansant, Ocean Grove. The following papers were read: "Pharmaceutical Legislation," by H. P. Reynolds; "Syrup

of Tolu," by G. W. Parison ; "Experiments on Pepsin," by A. M. Ende ; "Remarks on the Parent Plant of the Cultivated Tomato," by J. M. Maisch. The Association meets next at Camden, May 20, 1885.

Kentucky Pharmaceutical Association.—Seventh Annual Meeting at Louisville, May 21 and 22, 1884. President, Jefferson Oxley, Nicholasville ; Secretary, James T. Cooke, Harrodsburg. The following papers were read : "Report on Private Formulas," by C. Lewis Diehl ; "This and That," by Jefferson Oxley ; "Gelatin-Coating Pills," by Edward C. Pfingst ; "Linimentum Saponis," by C. J. Porter ; "Commercial Quality of Tincture of Chloride of Iron," by Jacob A. Flexner. The Association meets next at Danville, May 20, 1885.

Iowa Pharmaceutical Association.—Fifth Annual Meeting at Marshalltown, May 27, 1884. President, W. S. McBride, Marshalltown ; Secretary, E. Boerner, Iowa City. The following papers were read : "Tincture of Iron," by J. W. Ballard ; "Kousso," by Rosa Martin ; "Secret and Non-secret Medicines," by Dr. Graham ; "Strength of Commercial Ammonia Water," by E. Wiebenson ; "A List of the Medicinal Plants of the State," by ——— ; "On the Quality of Cod-liver Oil," by ——— ; "On the Adulteration of Olive and Almond Oil," by ———. The Association meets next at Council Bluffs, on the second Monday in June, 1885.

Ohio Pharmaceutical Association.—Sixth Annual Meeting at Cincinnati, May 27 and 28, 1884. President, Joseph Weyer, Cincinnati ; Secretary, L. C. Hopp, Cleveland. The following papers were read : "On the Purity of Quinine," by Virgil Coblentz ; "On Hoffman's Anodyne," by Virgil Coblentz ; "On Salicylic Acid," by J. Winchell Forbes ; "On Extract of Malt," by J. L. Irwin ; "Jackson's Pectoral Syrup," by J. U. Lloyd. The Association meets next at Sandusky, May 20, 1885.

Pennsylvania Pharmaceutical Association.—Seventh Annual Meeting at Wilkes-Barre, June 3 and 4, 1884. President, Charles H. Cressler, Chambersburg ; Secretary, Jacob A. Miller, Harrisburg. The following papers were read : "The Practical Use of the Microscope in Pharmacy," by L. A. Ridgway ; "Glycerin," by George W. Kennedy ; "Weight and Volume," by Gustavus Pile ; "Boroglyceride," by L. E. Sayre ; "The Moral Responsibility of the Druggist," by J. T. Rodman ; "The Insecticide Value of Commercial Insect Powder," by William H. McGarrah ; "Extract of Malt," by Alonzo Robbins ; "The Use of Cotton in the Preparation of Medicated Waters," by J. William Landis ; "Infusion of Digitalis," by William B. Thompson ; "The Preparation of the Officinal Benzoates," by S. Henry Stevens ; "Granulated Citrate of Magnesium," by William L. Turner ; "Convallaria Majalis," by F. M. Bouton ; "Plaster Spreading," by Wm. B. Thompson ; "The Use of Caramel in Pharmacy," by Andrew Blair ; "Pyroxylin," by Gustavus

Pile ; "Theory of the Formation of Luray Cave," by H. Kingsbury ; "The Sale and Use of Nostrums," by C. F. Randolph ; "The Desirability of a Thorough Organization of Pharmacists," by M. N. Kline ; "Pharmacy in Pennsylvania," by George W. Stoeckel ; "Personal Responsibility of Pharmacists," by John W. Ridpath ; "The Manufacture of Lactic Acid," by J. L. Lemberger ; "The Proper Education of Apprentices," by S. Henry Stevens ; "On the Cultivation of Medicinal Plants," by C. L. Lochman ; "Cod Liver Oil," by Robert J. Hardy ; "Some Things a Druggist Should Know about the Practice of Medicine and Surgery," by H. Pursell ; "Counter Prescribing," by Samuel T. Barton ; "Oil of Ergot," by Charles T. George. The Association meets next at Erie, June 2, 1885.

Massachusetts Pharmaceutical Association.—Third Annual Meeting at Lowell, June 4 and 5, 1884. President C. B. Emerson, Haverhill ; Secretary, J. W. Colcord, Lynn. A number of practical papers were read and discussed. The Association meets next at Pittsfield on the first Wednesday in June, 1885.

West Virginia Pharmaceutical Association held its Annual Meeting at Parkersburg, June 10, 1884. President, C. M. Shrewsbury, ——— ; Secretary, Chas. Moenkenmoeller, Wheeling. Several papers of scientific interest were read. The Association meets next at Grafton, June 9, 1885.

Missouri Pharmaceutical Association.—Sixth Annual Meeting at Brownsville, June 10, 1884. President, O. A. Wall, St. Louis ; Secretary, G. H. Chas. Klie, St. Louis. The following papers were read : "Emulsions," by J. M. Good ; "Fluid Extracts by Percolation and Re-percolation," by G. H. Chas. Klie ; "Ozokerite," by F. W. Sennewald ; "Tasteless Iron Preparations," by H. M. Pettit ; "Precautions to be Taken in Prescribing Drugs and Preparations," by O. A. Wall. The Association meets next (again) at Brownsville in June, 1885.

New York Pharmaceutical Association.—Sixth Annual Meeting at New York City, June 10, 11 and 12, 1884. President, Wm. H. Rogers, Middletown ; Secretary, Clay W. Holmes, Elmira. The following papers were read : "Daturina," by J. D. Aug. Hartz ; "A Plea for Botany," by Alfred B. Huusted ; "Trade Interests of Pharmacy," by Clark Z. Otis ; "The Requisites of a Pharmacist," by T. S. Corwin ; "Reminiscences of a Pharmacist Within the Past Half-Century," by John Higgins. The Association meets next at Saratoga Springs, June 9, 1885.

Kansas Pharmaceutical Association held its Annual Meeting at Leavenworth, June 11, 1884. President, W. C. Johnson, Marshallton ; Secretary, J. T. Moore, Lawrence. The following papers were read : "Method of Training Apprentices," by R. H. T. Nesbit ; "Strontia as

Found in Kansas," by Robert J. Brown; "Menstruum for Fluid Extract of Eucalyptus Globulus, Ustilago Maidis, Erythroxylon Coca, and Rhamnus Frangula," by H. W. Mehl; "Poison Law of Kansas," by W. C. Johnson. The Association meets next at Lawrence, June 11, 1885.

Wisconsin Pharmaceutical Association.—Fifth Annual Meeting at Madison, August 5, 1884. President, George Howard, La Crosse; Secretary, E. B. Heimstreet, Janesville. The following papers were read: "Adulteration of Narcotic Drugs," by M. L. Hackley; "On the Use of the Microscope in Pharmacy," by F. B. Power; "Phosphoric Acid," by Charles H. Avery; "Quality of Citrate of Iron and Quinine," by C. H. Burnham; "Tests for Insect Powder," by J. C. Huber; "Percolation," by E. Sauerhering; "The Relation of Chemistry to Pharmacy," by F. B. Power. The Association meets next at Janesville, on the second Tuesday in August, 1885.

North Carolina Pharmaceutical Association held its Annual Meeting at Charlotte, August 14 and 15, 1884. President, V. O. Thompson, Winston; Secretary, J. C. Munds, Wilmington. The following papers were read: "Preparations of Digitalis," by W. H. Green; "Dispensing Poisons and Filtering Prescriptions," by E. M. Nadal; "Tincture of Opium," by William Simpson; "Purity of Foreign and Domestic Quinine," by W. H. Green; "To What Extent Are Pharmacists Justified in Manufacturing or Endorsing Proprietary Preparations, the Formulas of which are Kept Secret?" by H. R. Horne; "On Suppositories of Cacao Butter and of Gelatin," by V. O. Thompson. The Association meets next at Greensboro, August 5, 1885.

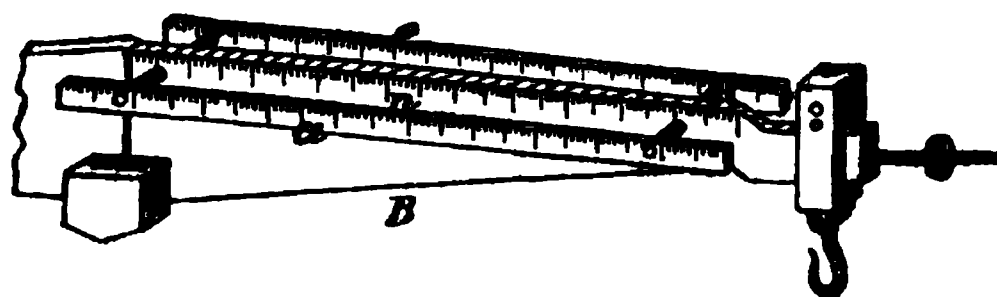
PHARMACY.

A. APPARATUS AND MANIPULATIONS.

WEIGHTS—MEASURES, ETC.

Balances—Improvements.—Mr. J. Kruttich suggests an improvement for analytical balances, whereby all small weights are dispensed with, the adjustment being made by riders. For this purpose one arm of the balance contains two additional beams (see Fig. 1.), divided into decimals each divided by the rider. One beam indicates decigrams, the next centigrams, the third milligrams. Supposing the scale-pan contained 12 full grams, and the three riders occupied respectively the marks: 3, 5, 2, on the three beams, then the total weight of the substance on the other scale-pan would be 12.352 grams. New Rem., December, 1883, 358; Dingt. Polyt. Jour., Vol. 249, 85.

FIG. 1.

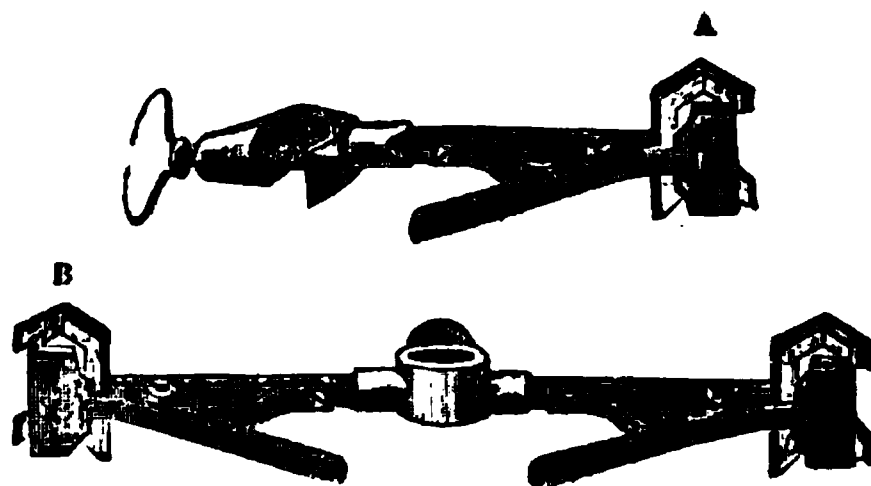


Balances.

Specific Gravity.—Prof. P. W. Bedford has written a very interesting paper on the subject of specific gravity, which is suited particularly to students, and to which reference may be had in Pharm. Rec., August 1, 1883, 273-275.

Burette Clamp (Holder)—New Construction.—Dr. Robert Muencke has introduced a new form of burette holder, or clamp, which is shown by Fig. 2. The new clamp possesses the double advantage that it may receive and hold burettes of any diameter, and so that the graduated

FIG. 2.



Burette Clamp.

scale may be easily read, but also that the burette may be quickly taken out and exchanged for another.

The holder consists of an arm fitting to the upright rod of a retort-stand in the usual manner. At its outer end it has an angular claw, the open side of which is closed by a plate pressed against it by a spring acting upon its handle. The inside of the claw and plate are covered with a thin layer of cork. The clamp is either single or double. By a pressure upon the projecting handle of the plate-piece, the burette is readily disengaged. When held in place, its front is not grasped by any part of the apparatus; hence the graduated scale is always fully exposed. —Amer. Drug., April, 1884, 69.

Weight by Measure.—Dr. A. B. Lyons communicates the following carefully prepared table, showing the comparative weight and volume of the more important officinal liquids. The table will prove very useful to dispensers, and may therefore properly find place in this report. The author has adopted as the weight of a gallon of water, the figure which Dr. Squibb fixed upon after a careful review of the whole subject in his

alcoholometric tables, and which has at least a quasi legal authority. According to this value a fluidounce of water at its maximum density weighs 456.0325 grains; at a temperature of 60° F. its weight is 455.6417 grains.

Liquids.	Spec. Grav. U.S.P.	Vol. of 1000 Grams in litres.	Vol. of 100 oz. av. in fl. oz.	Vol. of 1000 gr. in fl. oz.	Vol. of 100 gr. in min- ims.	Weight of one pint in grains.	Weight of one fl. oz. in grains.	Weight of one fl. oz. in oz. av.
Acid acetic	1.048	.9542	91.54	2.092	100.44	7626.7	477.92	1.0924
Acid acet. dil	1.0083	.9918	95.17	2.175	104.41	7357.1	459.82	1.0510
Acid hydrochloric	1.160	.8621	82.70	1.890	90.74	8465.0	529.00	1.2091
Acid hydrochloric, dil	1.049	.9533	91.45	2.090	100.34	7654.0	478.38	1.0934
Acid lactic	1.212	.8254	79.18	1.810	86.87	8843.3	552.71	1.2633
Acid nitric	1.420	.7042	67.56	1.544	74.12	10361.1	647.57	1.4801
Acid nitric, dil	1.059	.9443	90.59	2.071	99.39	7727.0	482.04	1.1039
Acid oleic . . . . .	.800	1.2500	119.92	2.741	131.57	5837.2	361.83	.8339
Acid phosphoric	1.347	.7424	71.22	1.628	78.14	9828.4	614.28	1.4041
Acid phos., dil	1.057	.9461	90.76	2.075	99.58	7712.4	482.03	1.1018
Acid sulphuric	1.840	.5435	52.14	1.192	57.19	13425.6	839.10	1.9179
Acid sulphuric, dil	1.094	.9141	87.69	2.004	96.21	7982.4	498.90	1.1403
Æther . . . . .	.750	1.3333	127.91	2.924	140.34	5472.4	342.03	.7818
Æther, stronger . . . . .	.725	1.3793	132.33	3.025	145.18	5290.0	330.62	.7557
Alcohol (60° F.)* . . . . .	.820	1.2205	117.09	2.676	128.47	5978.0	373.63	.8540
Alcohol (70° F.)* . . . . .	.812	1.2325	118.24	2.703	129.73	5919.7	369.98	.8457
Alcohol, dil. (60° F.)* . . . . .	.928	1.0785	103.47	2.365	113.52	6765.4	422.84	.9665
Alcohol, dil. (77° F.)* . . . . .	.920	1.0879	104.37	2.386	114.51	6707.0	419.19	.9582
Aqua (60° F.) . . . . .	.9991	1.00086	96.02	2.196	105.35	7290.3	455.642	1.0415
Aqua ammoniæ . . . . .	.959	1.0428	100.04	2.287	109.76	6997.4	437.34	.9996
Aq. ammon. fort . . . . .	.900	1.1111	106.60	2.436	116.95	6566.9	410.43	.9381
Benzin . . . . .	.670	1.4925	143.24	3.273	157.10	4888.7	305.54	.6984
Chloroform (pure).	1.488	.6720	64.47	1.474	70.74	10857.2	678.58	1.5510
Glycerin	1.250	.8000	76.75	1.754	84.20	9120.7	570.04	1.3030
Liq. ferri chloridi	1.405	.7117	68.28	1.561	74.91	10251.6	640.73	1.4645
Liq. ferri tersulph	1.320	.7576	72.68	1.661	78.74	9631.4	601.96	1.3759
Liq. potassæ	1.036	.9653	92.60	2.117	101.67	7559.2	472.45	1.0799
Liq. sodæ	1.059	.9443	90.59	2.071	99.39	7727.0	482.04	1.1039
Ol. amygd. express . . . . .	.917	1.0905	104.62	2.193	105.26	6690.9	418.18	.9558
Ol. aurant. cort . . . . .	.860	1.1628	111.55	2.550	122.39	6275.0	392.19	.8964
Ol. gaultheriæ	1.173	.8525	81.79	1.869	89.73	8558.8	534.93	1.2227
Ol. lavandulæ . . . . .	.890	1.1236	107.79	2.464	118.27	6493.9	405.87	.9277
Ol. limonis . . . . .	.850	1.1765	112.87	2.580	123.83	6202.0	387.63	.8860
Ol. menth. pip . . . . .	.900	1.1111	106.60	2.436	116.95	6566.9	410.43	.9381
Ol. morrhuæ . . . . .	.920	1.0870	104.28	2.383	114.41	6712.8	419.55	.9590
Ol. olivæ . . . . .	.916	1.0917	104.73	2.394	114.91	6683.6	417.73	.9548
Ol. ricini . . . . .	.960	1.0417	99.94	2.284	109.65	7004.7	437.79	1.0007
Ol. terebinthinæ . . . . .	.862	1.1601	111.30	2.544	122.11	6289.6	393.10	.8985
Spt. æther. nitros . . . . .	.824	1.2136	116.42	2.661	127.74	6012.3	375.77	.8589
Spt. frumenti . . . . .	.920	1.0870	104.28	2.383	114.41	6712.8	419.55	.9590
Spt. vini gallici . . . . .	.930	1.0753	103.16	2.358	113.18	6785.8	424.11	.9694
Syrup. simplex	1.310	.7634	73.22	1.674	80.35	9558.4	597.40	1.3655
Tinct. ferri chloridi . . . . .	.980	1.0204	97.89	2.238	107.40	7150.6	446.91	1.0215
Wine (red or white)	1.000	1.0000	95.94	2.193	105.26	7296.5	456.03	1.0424

* Water at 60° F. = 1.000.

—Amer. Jour. Phar., December, 1883, 595-597.

Weight of Drops.—Mr. Boymond communicates a paper on the weight of drops of different liquids, and gives, after drawing attention to the causes of variation, an extensive list showing the weight of single drops and of the number of drops required for a gram of the respective liquids dropped under as near as possible identical conditions.—Arch. d. Pharm., January, 1884, 25-29.

Size of Drops.—Professor Charles F. Himes communicates a very interesting paper on this subject, in which he draws attention to the incorrectness of the statement, in the 15th edition of the U. S. Dispensatory, that “the drops from a full bottle should be less (in size ? Rep.) than from one more or less emptied.” This statement is decidedly at variance with the results of experiments made by the author, who finds that other con-

ditions remaining the same. drops diminish in size as the bottle is emptied. The author also draws attention to the circumstance that notwithstanding the painstaking character of the investigation of the conditions affecting the size of drops, as recorded in the American Journal of Pharmacy, this one, degree of the fullness of the bottle, is practically uninvestigated. In his experience there seems to be no condition varying with the same regularity except the amount of liquid in the bottle, and consequent size of drops ; and these differences in the size of drops are such as cannot in all cases be overlooked with prudence in the administration of medicines.—Amer. Jour. Phar., Aug., 1883, 394-397.

Dispensing by Drops.—Mr. Albert Henry Kinsey has recorded the results of his experiments made with a view to determine the variation in the size of drops under different conditions. His experience is, in conformity with others, that the same liquid under different, and even the same circumstances, varies in dropping so much, that no reliance whatever can be placed in this method of dispensing medicines, and that therefore their administration in this form is always attended with more or less danger. The following table, showing the number of drops making a fluid drachm of the same liquids when dropped from the lip of the bottle, from the glass stopper of the same, and from a minim measure, will be found of interest, and may be useful for reference :

PREPARATION.	Shop bottle.	Glass stopper.	Minim measure.
Acetum Lobeliae	51	48	64
“ Opii	66	57	65
“ Sanguinariae.	102	92	92
Acid, Acetic.	82	49	101
“ “ Dilute.	94	55	99
“ Carbolic	82	66	110
“ Hydrobromic	57	65	70
“ Hydrochloric	60	57	96
“ “ Dilute.	70	51	62
“ Nitric	82	66	124
“ “ Dilute	63	60	81
“ Nitrohydrochloric	87	74	92
“ “ Dilute	58	54	62
“ Phosphoric, “	54	43	62
“ Sulphuric	160	152	172
“ “ Dilute	57	47	60
“ Sulph. Arom.	97	94	144
Aqua Ammoniae.	45	41	54
“ Destillata	64	“	61
Liquor Potass. Arsen.	58	61	77
Oleum Anisi	76	73	112
“ Amygdalae Am	102	77	125
“ Cari.	108	84	133
“ Chenopodii.	94	75	129
“ Caryophylli	98	75	133
“ Cinnamomi.	77	73	112
“ Crotonis	84	62	104

PREPARATION.	Shop bottle.	Glass stopper.	Minim measure.
Oleum Cubebæ	86	80	120
“ Gaultheriæ.	93	93	136
“ Hedeomæ	95	83	130
“ Lavandulæ.	105	78	133
“ Monardæ	82	76	125
“ Menthæ Pip	88	73	132
“ “ Viridis	95	81	132
“ Myristicæ	98	83	128
“ Origan	91	83	133
“ Pimentæ.	102	86	133
“ Rosmarini	92	88	133
“ Sassafras	83	77	142
“ Tanacet	110	91	136
“ Terebinthinæ	103	90	142
Spiritus Ammon. Ar	108	87	139
“ Camphoræ	98	79	140
“ Æther. Comp	120	88	140
“ “ Nit	88	86	144
“ Menthæ Pip.	98	86	143
Syrupus Sciliæ Comp.	106	87	122
Tinctura Aconiti.	120	102	164
“ Asafoetidæ	102	85	145
“ Belladonnæ	94	81	128
“ Benzoini Co.	98	81	146
“ Cannabis Ind.	124	120	98
“ Cantharidis.	118	97	136
“ Capsici	116	88	143
“ Colchici	86	80	124
“ Digitalis.	114	79	145
“ Ferri Chlor.	108	.	139
“ Hyoscyami.	114	91	147
“ Ignatiæ.	112	83	140
“ Iodi.	112	97	144
“ Kino	116	100	148
“ Krameriæ.	117	96	150
“ Lavand. Co	97	86	141
“ Lobeliæ	110	79	138
“ Myrrhæ	100	95	145
“ Nucis Vomicae.	112	105	148
“ Opii	98	92	143
“ “ Camph.	94	86	135
“ “ Deodor.	109	89	141
“ “ Rhei	98	82	144
“ Sanguinariæ	110	88	134
“ Serpentariæ.	98	89	146
“ Stramonii.	100	93	120
“ Tolutana.	120	97	156
“ Veratri Virid	108	98	152
Vinum Aloes	71	54	94
“ Colchici Rad	92	72	95
“ “ Sem	86	71	105
“ Ergotæ	148	99	122
“ Opii.	96	72	102

—Amer. Jour. Phar., April 1884, 181-184.

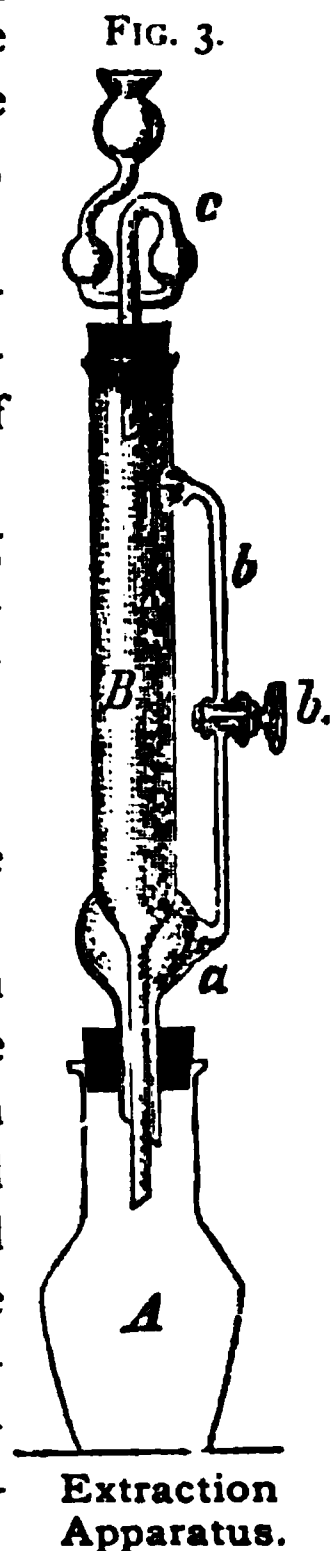
SOLUTION, FILTRATION, ETC.

Extraction Apparatus—Improved Form.—A Gawalowski, having had

an opportunity of comparing the different forms of extraction apparatus hitherto recommended, finally decided in favor of that devised by Ph. Wagner.

But even here the author found it possible to apply an improvement, the utility of which will be seen further on. (See Fig. 3). The principal addition is a small stop-cock *b*, in the lateral tube *b*. The lower part of the cylinder *B*, which contains the substance to be extracted is enveloped by a larger bulb *a*, so that the hot ether vapor may keep it constantly hot. Finally, in place of attaching to the apparatus an upright condenser, he attaches to it merely a Welter's safety-tube *c*, which serves both as a guard against the escape of vapors, and as a funnel for adding more menstruum.

The use of the faucet *b* will be understood by imagining the apparatus in operation. Cylinder *B* contains the substance to be extracted, in fine powder, placed on a pellet of pure cotton which is put in the neck. The receiver *A* is charged with a sufficient amount of volatile liquid, (ether, etc.,) all the parts connected together, and the flask *A* warmed on a water-bath—the faucet being open. After the vapor has traversed the apparatus long enough to have exhausted all or most of the soluble matters in the substance, the apparatus is removed from the water-bath and the faucet closed. As the temperature falls, a partial vacuum will be produced in the receiver *A*, and this will cause the liquid still retained by the substance in *B* to be almost completely sucked down into *A*. This may be repeated once or twice, and will help to accomplish the exhaustion much more rapidly than is possible in the ordinary kinds of apparatus.



When substances are to be extracted, the solution of which would not become quite clear if filtered merely through cotton, the author uses a modification of the above apparatus, shown in the illustration, Fig. 4. Instead of connecting the exhaustor directly with the receiver, a modified Drechsel's funnel *D* is interposed, in which a plaited filter is spread out through which the solution is made to filter, and which is gradually washed by the subsequent portions of the menstruum as they fall into it from the extractor above.—Amer. Drugg., May, 1884, 89 from Zeitsch. f. Anal. Chem., 1883, 528.

Filtering and Percolating Apparatus.—Mr. G. F. Burton has devised and constructs the appliance shown in the accompanying cut (Fig. 5), to be used in connection with an ordinary funnel or percolator, designed to prevent loss by evaporation and the escape of odors, and to exclude dust and flies.

FIG. 5.

FIG. 4.

D

r

Extraction Apparatus.**Filtering and Percolating Apparatus.**

To use the apparatus, place the rubber stopper into the receiving bottle, and insert the funnel or percolator (previously packed). On this, place the cover. Into a suitable discharge bottle containing the desired quantity of liquid, insert the cork with the rubber tube attached, closed by means of the pinch-cock. Secure this inverted, at a proper height, directly above the cover, and pass the rubber tube through it as far as is desirable to permit the liquid to rise in the funnel or percolator. Press on the rubber of the cover to secure it firmly to the edge of the funnel or percolator. There should be a slight bend in the supply-pipe, otherwise it might draw the cover out of place; if too much, there will not be a free flow of liquid. Loosen the pinch-cock, when the liquid will flow until it reaches the end of the tube, and close it. Then no more will run until the liquid is low enough in the funnel or percolator to admit air, when more will flow as before. Should the quantity of liquid be small, or for any other reason it is not desired to use the supply vessel, insert the stopper in place of the tube.

When the liquid begins to drop from the percolator, if it is desired to set it aside for a given length of time to macerate, instead of closing the lower orifice with a cork, the flow may be stopped by closing the air tube by means of the pinch-cock.

The funnel or percolator should not be larger than eight and one-half inches in diameter. With a funnel of this size or a little smaller, a seven-inch filtering rack and No. 33 paper can be used. Should it be desired to use vessels the full size of the cover, to secure it perfectly tight, it may be necessary to weight it down with sand or by filling it with water.—New Rem. Aug. 1883, 233-234.

Filtration.—A writer in "Comptes Rendus" recommends the following method for preventing the passage of finely-divided precipitates through the filter. Filter paper is boiled with aqua regia until the mass is rendered fluid; it is then poured into a large quantity of water, and the white precipitate formed is washed by decantation. To render the texture of a filter very compact, it is filled with this material, previously stirred up in water, so as to form a very thin paste, and allowed to drain. The paper is thus covered with a layer, which obstructs the pores. Or a little of the same paste may be mixed with the liquid to be filtered.—New Rem., Dec., 1883, 360, from Chem. News.

Rapid Filtration.—Prof. B. F. Davenport has devised a simple means for inducing rapid filtration. The filter is prepared and supported at the point by a cone, as required by the suction methods, in a funnel, which it is best to have with its edges ground level, and held in any firm support.

The device is simply to have a glass plate about six inches in diameter and one inch thick, which has a quarter-inch thick soft rubber disc of the same size as the glass cemented to its surface. There is a hole through the centre of the glass and rubber plate. This heavy plate is large enough to cover any size funnel likely to be used, and will make a tight joint by its rubber side with the funnel, either through its own weight or if pressed down by the hand. Through its central hole air is forced in from a rubber tube connected with one of Fletcher's excellent foot-bellows, to any desired pressure. To prevent the air thus blown in from agitating too much the fluid contents of the filter, a square piece of very thin sheet-rubber, something larger than the hole, is fastened over it by its four corners, having pins passed slantingly through them into the rubber plate beneath it. This prevents the air from being blown straight down into the filter but makes it spread out sideways.

This method leaves free and easy access to both the filtrate and the filter by the simple lifting off of the plate from the funnel, is simple of application, and not likely to be out of working order when wanted for use. The pressure is under perfect control.—Amer. Drug., April, 1884, 72, from Chem. News, Feb. 1, 1884.

Automatic Filtration.—Mr. E. E. Robinson recommends the apparatus shown by Fig. 6 as the most convenient for keeping filters supplied with liquids to be filtered. To the longer limb of a siphon is attached a short piece of India-rubber tube projecting a little beyond the tube; the

India-rubber is closed by the narrow conical stem of a small glass globe which floats on the surface of the liquid in the funnel; when the liquid rises to a certain height the float is lifted, and stops the flow of the liquid, the narrow stem on the flask, which passes some distance into the siphon, acting as a guide.

The apparatus keeps the liquid in the funnel at a constant level, and may be left without attention until the filtration is complete.—*Amer. Drug.*, Mar., 1884, 48; from *Chem. News*, Dec. 7, 1883.

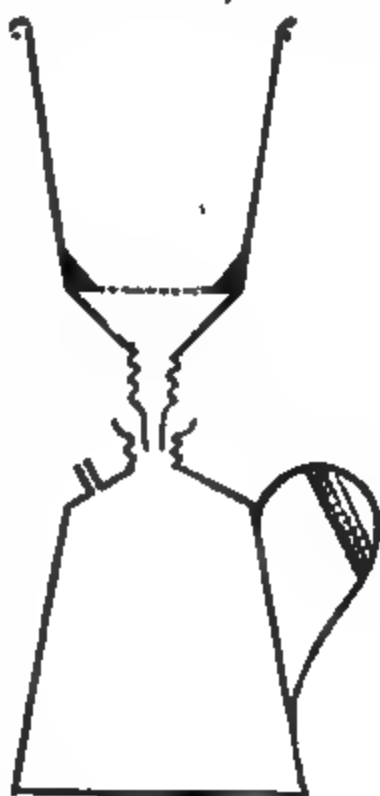
Apparatus for Rapid Filtering of Syrups, etc.—Mr. J. N. Hurty, describes the apparatus illustrated by Fig. 7, which is intended for the rapid filtration of syrups, fluid extracts, etc. It is made of heavy tin with the exception of the screw joint—which is zinc, found in stock at all tin stores—and the sieve of the upper part, which is silver-plated brass gauze. The gauze furnishes support for a disk of filter-paper. A narrow, solid ledge surrounds the supporting gauze, and makes a tight joint with the overlapping filter-paper. Any suction apparatus may be attached to the small tube on the top of the bottom vessel. Instead of the plated gauze, perforated tin may be used. If gauze be used, cross-wires must be underneath. With a pressure of 250 millimeters of mercury a quart of fluid extract can be filtered in ten or twelve minutes, and a quart of syrup in very little more time. The author has used asbestos for a filtering material with satisfaction.—*New Rem.*, July, 1883, 200.

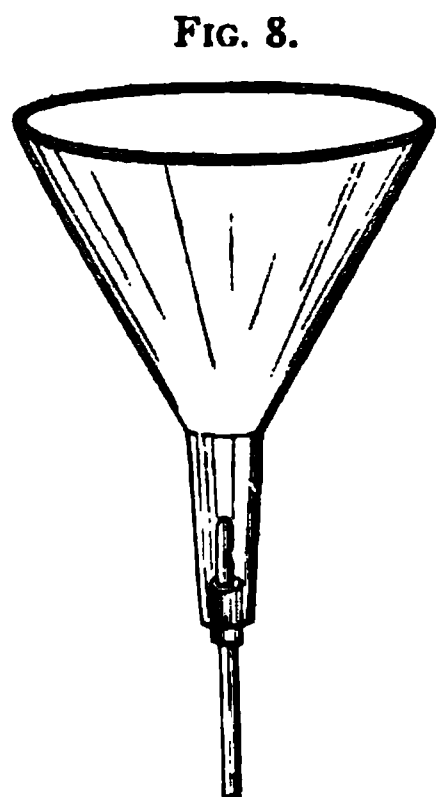
Separating Funnel—Simple Construction.—Mr. Charles O. Currier describes the construction of a cheap and easy substitute for the glass top-pered separating funnels, as follows: Take a glass tube four or five inches long and one-fourth of an inch in diameter. Close one end by fusing, and, three-fourths of an inch from the end, file a hole with a rat-tail file moistened with oil of turpentine and camphor. In the small end of the funnel (see Fig. 8) place a cork through which a hole has been made that will allow the tube to fit tightly. Insert the closed end of the tube in the cork so that the aperture in the side shall be just below the cork. When the contents of the funnel are to be drawn off, push the tube into the funnel until the hole is just above the cork; when the heavier liquid has passed out, pull the tube down until the hole is just

FIG. 6.

Automatic
Filtration.

FIG. 7.

Apparatus for Rapid Fil-
tering of Syrups, etc.



Separating Funnel.

FIG. 9.



Separating Tube.

below the cork. This allows the air to enter and the liquid remaining in the tube to flow out. Then by pushing the tube into the funnel as before, the remaining liquid can be drawn off. For volatile liquids a glass tube (Fig. 9), two inches in diameter and eighteen or twenty-four inches long, with the ends drawn down to three-fourths of an inch in diameter, makes an excellent separating tube. Amer. Drug., February, 1884, 25.

Funnel Support—Novel Construction.—Mr. S. Hucklenbroich describes a novel funnel-support, which is shown by Fig. 1c. A wooden hexagonal rod, *a*, about 3 cm. ($1\frac{1}{4}$ in.) in diameter, and 60 cm. (24 in.) long, perforated with numerous holes, and rounded off below and above, for a distance of about 5 cm. (2 in.,) is held in place by two iron supports, *b* and *c*, which are fastened to the wall; the lower end is hollow, and rests upon a pin, *i*, projecting from the lower arm. Three funnel-supports, *d*, about 35 cm. (14 in.) long are provided, each with different sized round holes, conically bored, so that the funnels will firmly set therein, and with a hexagonal hole at the end, which closely fits the wooden rod, and by means of which they may be raised or lowered without moving to and fro; being held in place by a pin, *f*. Each of the funnel-supports is provided, in front of the hexagonal hole at the under surface, with a shoulder to preserve the horizontal position, as shown at *r*.—Amer. Drug., Jan. 1884, 5; from Pharm. Zeitg.

Hot Water Wash-Bottle—New Construction.—Mr. Ost has devised an attachment whereby the accidental projection of steam into the mouth is avoided. Air is blown into the flask through a U-shaped tube, the inner end of which is provided with a flat glass shoulder. Through the stopper in the upper tubulure of the tube passes a curved glass tube held

in a central position by a shoulder blown on to its inner end. Inside of this tube another narrower one is placed, which slides up or down without friction, but which closes, while down, the inner orifice of the blowing tube.

When air is blown in the apparatus, the loose piston is driven upwards, and the air finds its way into the flask. As soon as the blowing is interrupted, the piston falls back again and closes the orifice of the blowing tube, preventing thereby the passage of steam or hot water into the mouth of the operator. Any confined steam will find its exit through the aperture.—*Amer. Drug.*, June 1884, 105; *Chemiker Zeit.*

Pharmaceutical Presses.—Dr. B. Hirsch makes some practical remarks on pharmaceutical presses, which see in *New Rem.*, Oct. 1883, 302.

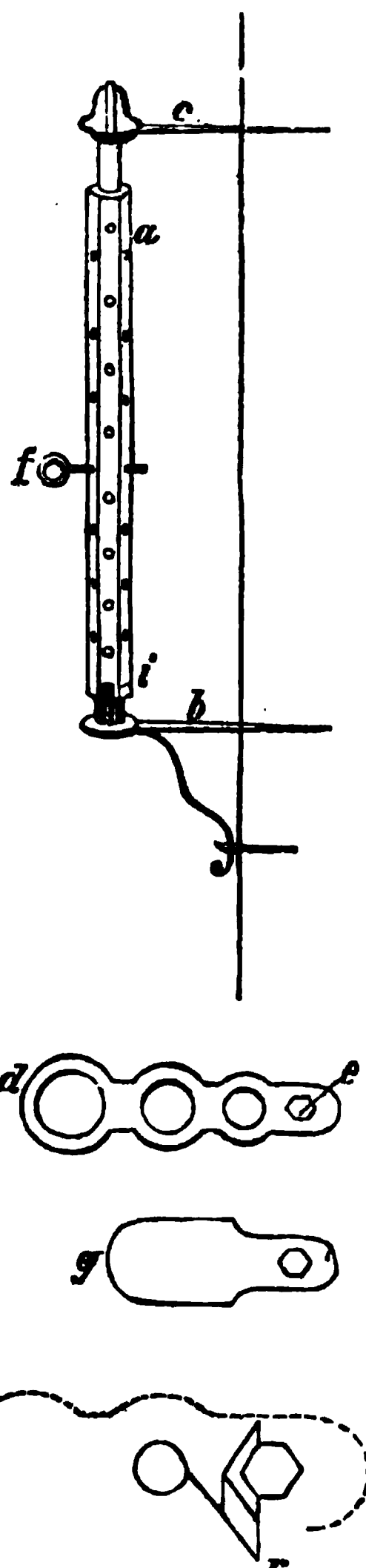
Hydraulic Presses.—Mr. Hans M. Wilder has noticed for some years that drug-sundrymen in Germany keep hydraulic presses on so small a scale as to have a capacity of only one quart. Since the power exerted is considerably more than that produced by the most powerful ordinary hand-press, such a press would certainly be a desideratum.—*Pharm. Rec.*, Feb. 1884, 53.

Centrifugal Apparatus—Use in Pharmacy.—Mr. Hans M. Wilder suggests that a centrifugal apparatus of some kind may serve a good purpose for depriving the dregs from percolation of liquid matter. A good plan would be to macerate (or insuccate) the coarsely comminuted drug (say No. 30 powder) for a couple of days with one-fourth the menstruum, “centrifuge” it, macerate the drug with another fourth, and so on. The idea was first suggested to Mr. Wilder by Mr. Frederick Stearns.—*Pharm. Rec.*, Feb. 1, 1884, 53.

Dialysis—Employment of Chloroform Water.

—Mr. Heinrich Struve has contributed a lengthy essay on the employment of chloroform water or ether, and their importance as antiseptics in the analyses of albuminoid substances. He observes that the process of dialysis has, during late years, been frequently employed in the study of albuminoids. The results were, however, often unsatisfactory, on account of the insufficiency of the conditions under which it was conducted. The failures may be attributed to the following

FIG. 10.



Funnel Support.

three causes: 1. The liability of the substances to decompose; 2. The employment of parchment paper: and 3. The difficulty of examining the dialyzed substances.

The first difficulty was attempted to be overcome by executing the dialysis at the lowest possible temperature, in the shortest possible time, and by frequent change of the external liquid and the parchment paper. But each experimenter was thereby made directly dependent upon temperature and time, and therefore was never in absolute control of the experiment. In regard to parchment paper, every one who has carried on the process of dialysis knows how difficult it is always to obtain a good and uniform article. London furnished the best paper for this purpose, which was much superior to the German. But even the English paper could not always be relied on, particularly if large surfaces were needed. If we also take into consideration the feeble resistance of the paper and the necessity of frequently renewing it and of working only with small quantities of liquids, with avoidance of pressure, it is surprising that this medium has been so persistently retained.

The investigations of the author being such as to necessitate the avoidance of any decomposition in the substances operated on, and to guard against loss by softening or tearing of the paper, he discarded parchment paper altogether, and selected animal bladder or gut. These were first soaked in water, then deprived as much as possible of fatty particles, and finally treated with several successive portions of ether. The prepared bladders or gut were then preserved under ether, in which they keep perfectly for years. In this manner, any desired stock of purified membranes may always be at the disposition of the operator, and one and the same bladder may even be used for several experiments.

As dialyzing menstruum (external to the membrane), the author uses chloroform-water, obtained by shaking water with chloroform in excess, and subsequently allowing to settle; also pure ether.

The applicability and advantages of chloroform water as dialyzing menstruum is based upon the remarkable antiseptic properties of chloroform even in minute quantities. This property of chloroform is well known, but it does not seem to have been sufficiently known that the same property attaches to chloroform-water.

The author has also experimented with *ether* as dialyzing menstruum. In this case he observed that the solution and extraction of substances soluble in ether contained in the interior of the object suspended in the liquid (as grapes, cherries, small animals, etc.), was accompanied by an expulsion of all water, together with the substances soluble in the latter.

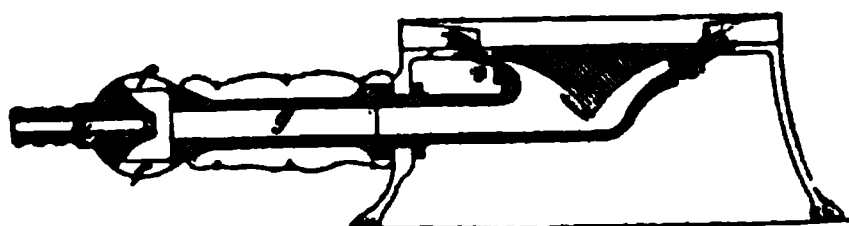
For the different applications of the author's methods reference must be had to the original paper in "Jour. f. Prakt. Chem." (1883), 231. See also New Rem. July 1883, 203-204.

APPLICATION OF HEAT, ETC.

Thermometric Measurements.—Mr. J. M. Crafts remarks that the progress made in the purification and preparation of chemical substances has not been accompanied by an appreciable improvement in thermometric measurements. He communicates an account of a series of experiments on the commonly employed methods of fusion and ebullition, with a view of facilitating the construction of thermometers, of examining their behavior, and rendering the method of observation precise, which, as abstracted from "Bull. Soc. Chim." (2, 39, p. 196), may be referred to in Jour. Chem. Soc., Sept. 1883, or Amer. Jour. Phar., Jan. 1884, 47-49.

Gas Stoves—Improved Construction.—In the accompanying illustration (Fig. 11), the new system of constructing gas burners is shown, which

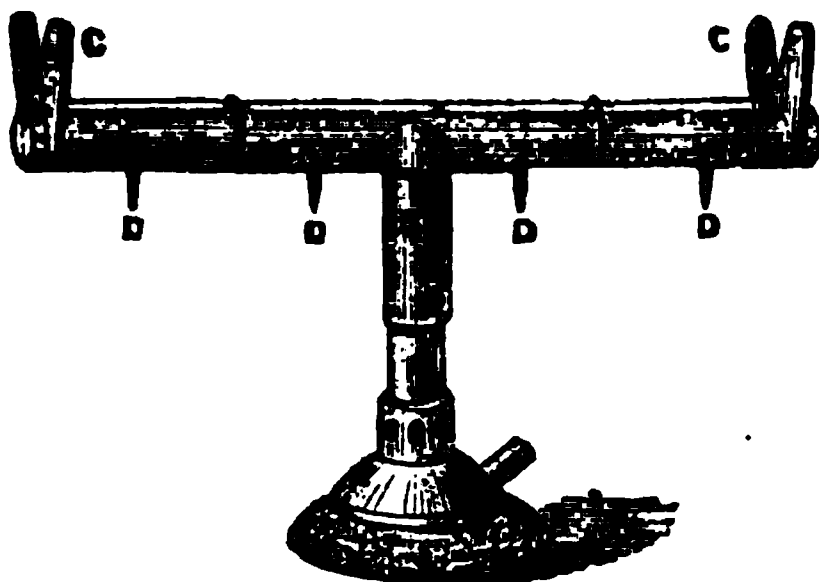
FIG. 11.



Gas Burner.

marks a considerable improvement, inasmuch as the mixture of gas with atmospheric air is rendered much more perfect at a considerable distance from the place of combustion. At *a* the gas enters, and is made to pass through a narrow orifice at the other end of the small branch, for the purpose of projecting the current with some force forward into the mixing tube *g*. The jet of gas thrown into *g* causes a current of air to be drawn in at *ff*, and to be mixed with it. The mixture issues at *ee*, and is there burned. Several gas stoves constructed on this principle are shown and described in New Rem., Dec. 1883, 362.

FIG. 12.



Long-Flame Bunsen Burner.

Long-Flame Bunsen Burner.—Mr. W. Ramsay, having long felt the want of a Bunsen's burner which should heat short lengths of combustion tubes to redness, etc., has constructed the burner illustrated by Fig. 12, and describes it as follows:

It consists of a brass tube *A*, with a brass *T*-piece, which can be fitted on to an ordinary Bunsen's burner, at right angles to the tube *A*. The horizontal tube is slit from end to end; it is closed at both ends, and provided with supports *CC*, in which the glass tube rests. As a substitute for stop-cocks are four pieces of wider brass tubing, which encase *A*, also slit along top, provided with brass pegs *DDD*, by means of which each can be moved so that the slit in *A* no longer coincides with the slits in the encasing tube. When the two slits coincide there is free passage for gas; but when the external tubes are made to revolve on *A*, the gas is shut off, and the flame is extinguished. Each encasing tube is two inches long, the whole tube being eight and one-half inches in length. At one end of *A*, a circular piece of brass projects for three-sixteenths of an inch, and on the lower side a short peg is inserted. On the other end there is a corresponding annular projection designed to receive the circular projection of another burner; in the ring there is a slot into which the peg from the second burner fits. The object of this is to connect one burner with another, so as to form a furnace of a series of three or four burners. Such a series answers the purpose of an ordinary combustion furnace, and has the following advantages: It is much less cumbersome; the gas can be more conveniently regulated than in an ordinary furnace, and combustion tubes consequently last for a longer time; there is no disagreeable smell, so that a combustion-room is not required; the combustion can therefore be performed on an ordinary laboratory bench; and the length of the furnace can be modified by using as many or as few burners as desired. There is, moreover, no danger of the flame "burning below;" it is a clear blue flame. The burner will doubtless also serve a useful purpose in the pharmaceutical laboratory.—*New Rem.*, October 1883, 300, from *Chem. News*, July 6, 1883.

Safety Burner—Construction.—To avoid the risk of fire or explosion, when evaporating ether or other inflammable liquids, by the flame of the water-bath setting fire to the vapor, Alexander Ehrenburg recommends the following contrivance: Construct two cylinders of fine-meshed wire gauze and push one inside the other, using a round iron as a form to keep the cylinder round. Fold in the ends above and below, and insert a top and bottom piece, likewise made of fine wire-gauze. Into the bottom a hole is made, through which the end of the burner is pushed, the place of insertion being made tight by a brass washer pressed upwards by means of a spring. This spring at the same time pushes the whole drum upwards, so that it may continuously remain in contact with the bottom of the water-bath. The inventor states that no ignition will take place, even though drops of liquid ether be thrown against the drum of wire-gauze.—*Amer. Drug.*, June, 1884, 108, from *Chem. Zeitung*.

Steam Boiler and Still for Pharmaceutical Uses.—Mr. Patch, of the

firm of Canning & Patch, has devised the steam boiler and pharmaceutical still shown in the accompanying cuts (Fig. 13. and 14). These have been introduced in the laboratory of the College of Pharmacy of the City of New York, and are recommended as being adapted to the wants of pharmacists, economical costing laid down in New York about \$100), and perfectly safe. The advantages are described as follows:

FIG. 13.

Pharmaceutical Steam Boiler.

Economy.—A gallon of oil will last about nine hours under a full head of smokeless flame; it will keep up a pressure of forty to sixty pounds if needed; and if there is no loss of live steam, there is no need to replenish the boiler. In eight hours it will, with the still shown, give sixteen gallons of distilled water at the cost of one gallon of oil.

Utility.—Among the uses to which it is admirably adapted, we may mention drying solids or evaporating fluids, hot filtration, distillation, facilitating solution; in fact, for any form of heat not exceeding 275° F., which admits of a steam pressure of 45 lbs. or three atmospheres.

Safety.—The boiler is made of steel, and being small, has far greater strength proportionately than boilers of larger size. Fitted with a re-

liable steam-guage, it always reveals its pent-up power; and a safety-valve that cannot be overloaded, it has as much the elements of safety as an ordinary stove.

The spiral coil to the right will do duty for hot filtration, for a hot-air bath, a water-bath, or a sand-bath, while above it an attachment makes it a very perfect drying closet. The attachment to the still is made with

FIG. 14.

Combination Pharmaceutical Still.

perfect ease on detaching the coil; and for distilling water, or recovering alcohol from residues or any other form of similar work, it is unapproachable by any other apparatus that has yet come to our notice.

In place of coals, the source of heat is a kerosene stove, the heating tubes of the boiler form the draught chimney, and, the boiler being jacketed with asbestos, there is no loss of heat by radiation. The apparatus has had extended trials by its designer before being offered to the public, and no claim is made for it that cannot be amply substantiated by facts.—Pharm. Rec., May 15, 1884, 257.

B. PREPARATIONS:

AQUÆ.

Medicated Waters—Preparation with Precip. Phosph. Calcium.—Mr. Joseph W. England criticises the different processes for the preparation of medicated waters, and finds the process of the Phar. 1880, in which cotton is employed, to be particularly objectionable and unreliable. After numerous trials he found precipitated calcium phosphate to possess all the desired properties, and to yield products that were in all respects the equal of those obtained by distillation.

This lime salt is a neutral impalpable solid, wholly insoluble in water, neutral or carbonated, and when used permits filtration much more readily and effectively than any other medium. In diffusive power it is fully the equal of any of the bodies previously mentioned; leaving nothing to be desired. Before its use, although generally very pure, tests should be always applied to determine that fact. It should be wholly soluble in dilute hydrochloric acid without effervescence (absence of carbonates). Its washings with distilled water should yield no opalescence or precipitate with test solutions of silver nitrate (absence of chlorides), barium chloride (absence of sulphates) or ammonium oxalate (absence of soluble lime salts).

When diffusive agents are used, they require long and persistent trituration with the oil to effect thorough and minute subdivision. In order to promote this diffusion, a plan of diluting the oil with a small quantity of alcohol was tried and found to work admirably. The presumed presence of alcohol in medicated waters thus made, has no foundation in fact, if the directions in the general formula, hereinafter given, are followed, as the rubbing to dryness necessarily volatilizes the whole of it.

General Formula for Preparing Medicated Waters.—Triturate, in a mortar of broad surface, the oil dissolved in the alcohol, with the precipitated calcium phosphate, until a dry powder is secured and all the alcohol has volatilized, then add the water in small portions at a time, stirring after each addition, until the intended quantity to be made is completed. Lastly, filter; returning to the filter the first portions, if cloudy.

The author gives the specific formula for the different medicated waters, and urges the necessity of employing materials of the best quality, all other means used to insure success being secondary to the purity of the ingredients used in the preparation of these waters.—Amer. Jour. Phar., Feb. 1, 1884, 65-71.

Distilled Water—Automatic Still.—See under "Apparatus."

Distilled Orange Flower and other Waters—Removal of Thready Formations.—Mr. P. Carles describes a simple means of clearing off the parasitic threads which so readily form in many of the distilled waters,

such as orange and elder flower and some rose-water, rendering them often viscous, albuminous and useless. The susceptibility to this impregnation is in direct relation to the quality of the water. Some writers, says Mr. Carles, have proposed the addition of tannin to the waters; but that, he says, changes their flavor and odor, and even then it does not succeed. Others, more thorough, recommend a redistillation which needs a tedious operation even if one has a still, and which, after all, leaves the most valuable portion of the product in the apparatus. The most usual treatment of waters which have become so affected is to throw them into the gutter. Acids and salts of lead, copper, or silver, Mr. Carles has found will kill the parasites, but there are objections to the use of these, and the best method, he states, is to make a few grammes of the subnitrate of bismuth into a milk, and shake it for a minute or two with the affected water. This does not injure the properties of the water in the

FIG. 15.

Bayonet-Joint Steam Pan.

least. Two or three grammes of salt are sufficient for a litre of the water, but it is better to use rather more, and the salt may be used repeatedly if it be slightly calcined after recovery. The water thus treated will clarify itself in a few hours and, in ordinary conditions, is not liable to re-invasion of the parasites.—Amer. Drug., Mar. 1884, 52; from Chem. and Drug.; Jour. de Phar. et de Chimie.

Tar Water—Preparation.—Mr. Thos. S. Wiegand recommends the

extemporaneous preparation of tar water by the addition of fss of glycerite of tar (which see under "Glycerites") to fxxvss of water.—*Amer. Jour. Phar.*, Jan. 1884, 8.

Pharmaceutical Apparatus.—Mr. Charles Symes describes a pharmaceutical apparatus, consisting of a boiler and the stills and pans necessary in a complete pharmaceutical laboratory. The paper is accompanied by an illustration of the different apparatus, and commends itself to pharmacists who aim to make their own preparations.—See *Phar. Jour. and Trans.*, March 29, 1884, 783-786.

Bayonet-joint Steam Pan.—The steam pan illustrated by Fig. 15 is constructed so that it may be at any time detached from the support and steam supply by a simple half turn. By this means the contents of the kettle may be poured out, instead of being emptied by dipping, or by the aid of a stop-cock. The socket upon which the kettle is placed is very slightly conical, so that the half-rotary motion by which the kettle is adjusted makes the joint steam-tight. The kettle is, of course, double-jacketed. *Amer. Drug.*, January, 1884, 3, from *Chem. Ztg.*

Constant-Level Water-bath.—Mr. C. Klement has constructed a water-bath, shown by Fig. 16, on the principle of Mariotte's flask. *A* serves

FIG. 16.

Constant-Level Water-bath.

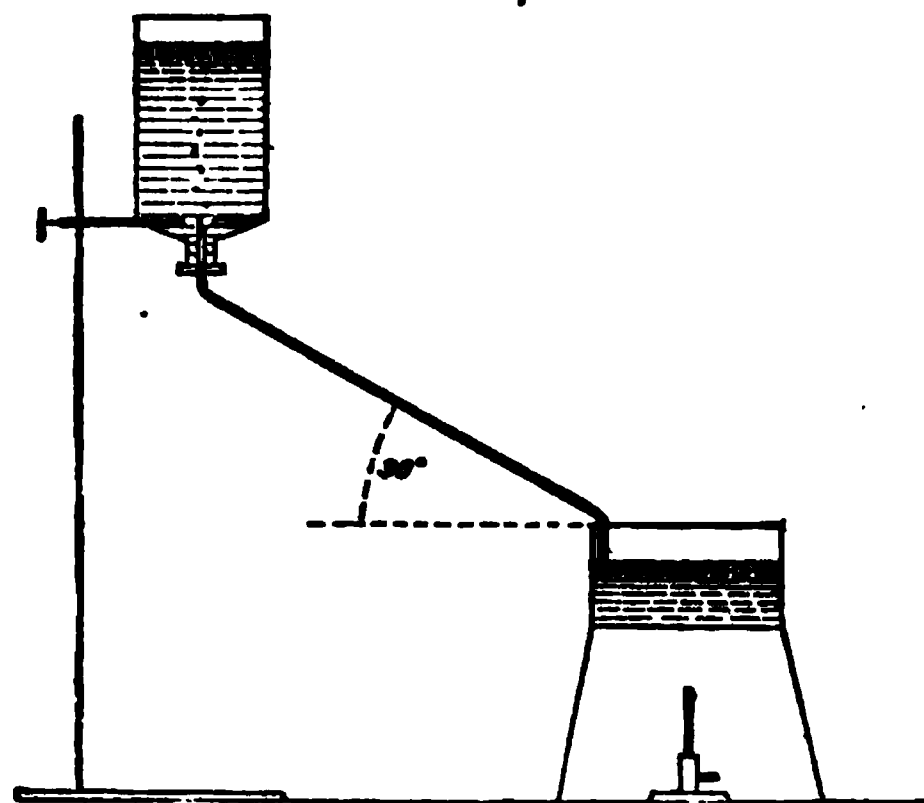
as reservoir of water, and is closed air-tight by the perforated India rubber stopper *B*. Through the latter pass four glass tubes, one of which, *a*, acts as a siphon, in connection with the rubber tube *c*, to supply water to the bath. The level in the latter is regulated by the depth to which the lower end of tube *a* reaches. The other two tubes, *b* and *c*, are closed while the apparatus is working, and are only used for filling it.

When this is necessary, the pinch-cock at *D* is made to compress the rubber tube, the stopper *E* of the tube *c* opened and water admitted to the flask through *F, f*. If it is inconvenient or impracticable to keep the short rubber pipe *f* constantly connected with a water faucet, it may, when the flask is filled, be detached, and the open end pushed upon the glass tube *c*, in which case it is not necessary that the latter be provided with a stop-cock.

By attaching several branches to tube *c*, any number of water-baths may be kept supplied at one and the same time.—New Rem., October 1883, 300, from Zeitschr. f. Anal. Chem., 1883, 390.

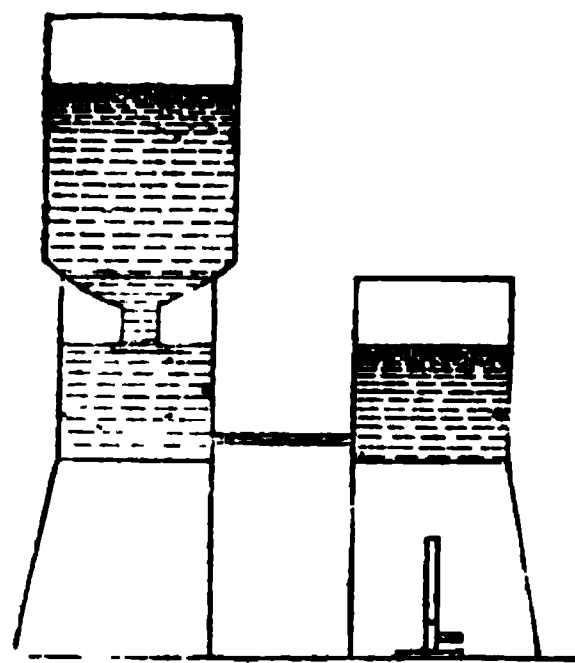
Constant Level Water Baths.—Charles T. Pomeroy describes the following water bath which is illustrated (Fig. 17). A tube of glass or metal, not less than one-quarter of an inch internal diameter, the ends of which are cut off obliquely (this is necessary), is bent as shown in the cut. It should make an angle of about 30° , or a little greater, with the horizon, and the angle may be increased if the bore of the tube is increased. One end is inserted into the water-bath, the other into an inverted bottle. The height of the water in the bath is regulated by the depth of immersion of the tube in it. The boiling is not interrupted by the feeding, which

FIG. 17.



Constant Level Water Bath.

FIG. 18.



Constant Level Water Bath.

takes place slowly and regularly. The same form of tube answers equally well for keeping a constant level of fluid in a filter or drying chamber. A brass tube is much better than one of glass, as it does not crack at the water level after use for a time. To bend brass tubes, ram them full of sand, stop the ends, and bend over a curved surface.

Prof. Peter T. Austen speaks highly of the water-bath shown by Fig. 18, which was contrived by Mr. Edward Bogardus. It consists of two tomato cans connected by a tin tube. Into one of the cans a bottle of water is inverted (e. g. a 5 lb. acid bottle), the other can makes the bath.

This bath can be left over night without risk, and a number of baths can be similarly fed by connecting them by means of a rubber tube with a single reservoir, made of a fruit can with a number of holes punched near its bottom, perforated corks carrying short pieces of glass tubing being fitted to the holes. A similar contrivance can be used to make the connection with the can serving as the water-bath. Such vents in the reservoir as are not in use can be closed by means of short bits of rubber tubing and pinch-cocks.—New Rem., Sept. 1883, 270, from Sci. Amer. Suppl.

FIG. 19.

Automatic Water Still.

Automatic Water Still.—A very useful automatic water still for druggists, chemical laboratories, etc., is illustrated by Fig. 19. The lower vessel is the boiler, the middle one the condenser tank, the upper one the supply tank provided with a loose cover. Of the four pipes shown, *A* is the steam and condensed water tube, coiled, as shown in the condenser tank full of water, and delivering distilled water at *A'*; *B* is a pipe leading from the water level in the boiler to the top of the supply tank; *C*, a pipe, with cock, leading from the bottom of supply tank to the con-

denser tank ; and *D*, a pipe leading from the top of the condenser tank to bottom of boiler. *E* is an opening, with air-tight stopper, for filling supply tank ; and *F*, a cock to draw off hot water from boiler.

The supply tank and condenser tank being filled with water (through *E* and the open top of the condenser tank, *E* and the cock in *C* being closed, and the boiler empty, the cock in *C* is opened. Air has free access through *A* and *B* to the top of the supply tank ; it, therefore enters, and water flows out of supply tank into condenser tank through *C*. This displaces the water in the upper part of condenser tank, which flows through *D* into the boiler. This action continues till the water has risen in the boiler above the opening of *B*, thus cutting off the supply of air to supply tank, and so the flow of water. Heat is then applied to the boiler in any convenient way : boiling soon begins, steam passes off through *A*, and is condensed therein, and delivered as distilled water at *A'*. When, by evaporation, the water level in the boiler is lowered so as to uncover the lower opening of *B*, the air again enters the supply tank through *A* and *B*, water flows through *C*, and the water at the top of the condenser tank, now heated by condensing the steam, passes over into the boiler, till the opening of *B* is again closed. This action continues, at intervals, so long as water remains in the supply tank. The advantages of this still are quite obvious and need no enumeration.—*Amer. Drug.*, Jan., 1884, 6, from *Scientific Amer.*

Liebig's Condenser—Modification.—*Mr. W. A. Shenstone* suggests a similar modification of Liebig's Condenser, which is shown in the cut (Fig. 20). The construction is as follows :

FIG. 20.



Liebig's Condenser.

A tube *A*, which may be of any convenient size, is fitted in the ordinary way inside a larger glass tube, for which purpose the old-fashioned method of employing corks answers better than the modern plan, in which the outer tube is contracted at its ends, and connected with the

smaller tube by pieces of India-rubber tube. At *B*, the tube *A* has a small projecting tube *F* about ten mm. in length. Into the side tube of *A*, so as to be below the level of the open end of *F*, a side tube *C*, having a slight dip at *c'*, is joined on, its open end *D* being about five mm. below the level of the other end. A small stopper is ground into *C* at *D*. *D* may conveniently be two mm. to three mm. in diameter.

The end *E* can be attached to flasks by means of corks, or as might occasionally be desirable, can be ground to fit the neck of a flask.

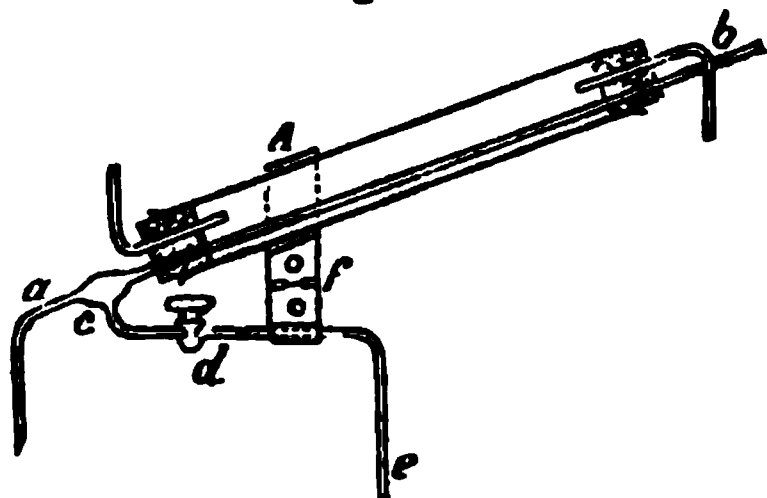
When the condenser is in action, the vapor passes up through *F*, is condensed in *A*, and falls into the annular space around *F* at *B*. If the stopper is fixed at *D*, this space soon fills, and then, as further condensation occurs the products overflow into the flask through *F*. The amount that collects at *B* with a well-made tube is very small, as the air in *C* usually prevents the liquid from flowing into it when the stopper is fixed. When the apparatus is to be used for distilling, the stopper *D* is removed, and the distillate then flows out at *D*. The bend at *C'* was made in order that the first portions condensed might flow there, and so prevent any vapor from escaping by *C* at the early part of the operation.

The outer tube should be brought down as near to the point as possible: for the vapor coming up through *F* slightly warms the liquid at *B*, so that it is delivered at a slightly higher temperature than that of the water in the condensing jacket, and it is desirable to avoid this as far as possible.

When the temperature of the vapor must be known, a thermometer is hung inside *E* by means of a little hook of platinum wire. The length of the tube therefore from *B* to *E* should be such that there shall be room for an ordinary thermometer between the point *B* and the level of the liquid in the flask below. It is perhaps an advantage that in thus using this condenser, the actual temperature of the vapor is observed, as the stem of the thermometer is entirely immersed in it.—New Rem., Aug., 1883, 241, 242, from Jour. Chem. Soc. 43, 123.

Liebig's Condenser—Improved Construction.—Ferdinand Simand observes that in chemical or pharmaceutical operations, it often becomes necessary, after having used an upright condenser for the purpose of continuous extraction, to reverse the whole condenser, in order to recover the volatile menstruum. This also necessitates, in most cases, a change of the current of water for cooling the apparatus. All this may be avoided by constructing the condensing tube in the manner shown in the illustration (Fig 21). From a bulbous expansion blown in the tube at its lower end, a tube *c* arises, provided with a faucet *d*, and subsequently turned at a right angle downwards. At about the centre between the faucet and the angle, the glass tube passes through a support connected with the condenser, whereby it is in a great measure protected from being broken off. The use of this modified condenser is almost self-evident.

Fig. 21.



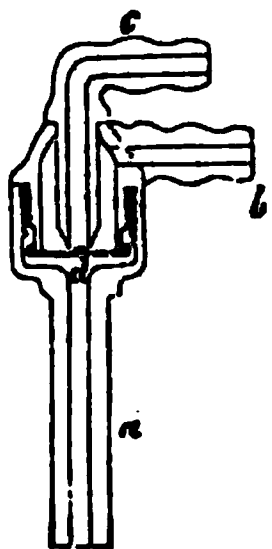
Liebig's Condenser.

If it is used for continuous extraction, so that the condensed liquid constantly flows back into the flask connected with *a*, the faucet at *d* is closed. The condensed liquid will then at first fill the tube *c* until it flows over into the tube *a*. Finally, when the operation is to be finished, a receiver is placed under *c*, and the faucet is opened, when all the condensed liquid may be collected without disturbing the connections of the condenser. It is advisable before opening the faucet *d* to dip the end of the tube *c* into a flask containing a portion of the liquid which is to be distilled over, for instance, ether. The depth to which the tube may be dipped should be less than the length of the column of liquid contained between *c* and *d*.—New Rem., Aug. 1883, 239, from Dingl. Polyt. Jour., 248, 463.

Drying Oven—Improvement.—Edward Seelig has communicated a method of preventing the loss of water, from evaporation, in drying ovens, and of confining the consumption of gas, at the same time, to the smallest possible quantity.

The outer shell of the drying oven must have only *one* exit, communicating with the water space between the walls. Into this opening, the apparatus shown in the illustration (Fig. 22), is firmly fastened by means of a perforated stopper surrounding the leg *a*. The lateral branch *b* communicated with the source of gas, and the branch *c* is connected with the burner under the drying oven. The tube *a* is expanded above, and closed by a rubber membrane *d*. This prevents, in the first place, loss of the water by evaporation. As soon as the tension of the steam in the apparatus has become higher than it was at the time of adjusting the apparatus, the membrane bulges upwards, closes the outlet of tube *c*, and thereby diminishes the supply of gas to the burner. The total extinguishment of the flame is prevented by a scant supply of gas reaching the burner through a small lateral opening in the inner leg of *c*.

FIG. 22.

Attachment to
Drying Oven.

It will be readily seen that, if the apparatus is adjusted at the time when the water has actually reached the boiling point, it may be kept for any length of time at the temperature of boiling water without having

to renew the latter.—New Rem. Aug. 1883, 244, from Zeitsch. f. Anal. Chem., 1883, 239.

Nickel Crucibles, to replace *Silver Crucibles*, are recommended by Mr. Mermet. Whilst they are slightly attacked by caustic potash, those of silver are not indifferent to this action. On the other hand, they have the great advantage of melting at a higher temperature, and are cheaper.—New Rem. Dec. 1883, 267, Chem. Indust.

CERATA ET UNGUENTA.

Ointment Bases.—Mr. W. Willmott has communicated a very lengthy paper at the meeting of the British Pharmaceutical Conference, 1883, in which he gives the results of very comprehensive experiments with the ointment bases. The object of the experiments was to contribute towards clearing up the pharmaceutical side of the question as to what is the best substance to be used as a basis for ointments in respect to securing efficiency and stability, the substances experimented upon being lard, oil and wax, and mineral hydrocarbons; and the experiments having been continued over a considerable period, the author infers from the results of his experiments that the washing and straining, or washing and filtering of lard are without advantage in its preparation for use as an ointment basis, the best results having followed the simple process of melting and straining. In any case the condition of rancidity in lard is quickly developed, though it may be obviated to a very large extent by the use of benzoin. Mixtures of oil and wax are stable when the yellow unbleached wax is used, but not when the official "white wax" is used. Of the various hydrocarbons hitherto in use as ointment bases, the author is inclined to award the palm to vaseline, but he says that he has found it to develop a disagreeable odor, especially when melted with paraffin, "white wax" or spermaceti, or in the presence of carbonate or acetate of lead, but the odor is not developed when yellow wax is mixed with it. Another new hydrocarbon basis, called "white ozokerine," is reported to have given more satisfactory results. For the particulars of the author's experiments, reference must be had to the original paper in Year-book of Pharmacy, 1883, 498–515.

Ointments.—Preparation and purification of *Lard*, which see under "Organic Chemistry."

Benzoinated Lard—Modification of U. S. Process.—Mr. J. N. Hurty draws attention to the fact that the benzoin, which is directed to be in coarse powder and enveloped in a muslin bag, agglomerates during the heating with the lard, which does not seem able to extract the balsamic principles. This objection is overcome, in the author's experience, by mixing the benzoin with an equal quantity of well washed and ignited white sand. The author ties the muslin bag over the end of a stout

glass stirring rod, and stirs with this constantly at a temperature of 65° to 70° C. for two hours. The increased temperature is regarded an advantage, and the product is perfectly satisfactory.—Drug. Circ., Oct., 1883, 151.

Cold Cream—Improved Method of Manipulation.—Mr. Ad. Vomacka communicates the following formula and directions for cold cream:

White wax	200 parts.
Spermaceti	500 "
Oil of almonds, expressed	1600 "
Rose water	80 "
Oil of rose, for each 2.4 kilos	30 drops.

Melt the wax and spermaceti at a gentle heat on the water-bath, pour the mass into a very shallow, warmed porcelain dish, and let it stand over night covered with paper. Next morning, begin to work the hardened mass by a gentle, uniform to-and-fro motion of the pestle, which should be held lightly between the fingers without exerting pressure, commencing at the edge, gradually working towards the middle, and mixing the whole thoroughly.

The prescribed amount of rose water is now slowly added, in a thin stream, and while constantly stirring. If desired, 5 grms. of borax may be dissolved in the rose water, which will facilitate the combination. The mortar is now well covered and set aside for one or two days, in order to give the fat a chance to combine with the water. It is then again briskly stirred for a quarter or half an hour, and, finally, the oil of rose is added, previously dissolved in a little castor oil, which latter imparts to the cold cream an extremely handsome dull lustre.

The readiness with which cold cream becomes rancid or acid makes it advisable to add to it some suitable preservative, if it is to be kept for any length of time. A very good method is to add a small quantity of salicylic acid dissolved in rose water or sweet spirit of nitre.

In place of oil of rose, other oils or mixtures of oils may be used, as for instance:

1. Oil of neroli 10 parts.
Oil of rose 5 "
Oil of lemon 15 "
2. Oil of bergamot 9 grms.
Oil of lavender (finest) 3 "
Oil of rose 35 drops.
3. Oil of lemon 5 parts.
Oil of lavender (finest) 5 "
Musk. 0.4 "

Dispensing of Cold Cream with Yellow Oxide of Mercury.—These may sometimes cause trouble when dispensed together. A case is reported in the *Wiadomosci Farmaceutyczne*, in which the following prescription

Hydrarg. oxidi flavi	gr. $\frac{1}{2}$
Plumbi acetatis	gr. 2
Unguenti aquæ rosæ.	3 2

was prepared by several pharmacists. In some cases, the mixture turned white, and was thus dispensed; in other cases, it retained its yellowish tint unaltered. On closer examination, it turned out that the cause of the trouble lay in the cold cream, which, by keeping, had acquired an acid reaction from the separation of fatty acids. Freshly prepared cold cream produced no change in the mixture.

It is, under all circumstances, advisable to keep but a small quantity of cold cream in stock, at least not more than is likely to be consumed in a month, particularly during warm weather. In winter time, a larger quantity may be prepared, and kept in a cold place.—*New Rem.*, Sept. 1883, 262.

Glycerin Ointment—New Formula.—Mr. J. Mulfinger states that an ointment which protects the skin and keeps it soft is made with 225 parts of best glycerin, and 5 parts of powdered tragacanth, to which is added 5 parts of borax and 25 parts of rose water. The dry, powdered tragacanth, free from lumps, should be triturated with 50 parts of glycerin, after which the remainder of the glycerin may be added and heat applied. This mixture adheres well to a greasy skin, withdraws moisture slowly, and does not cause the irritation sometimes felt by delicate skins when glycerin is applied.—*Amer. Drug.*, Feb., 1884, 26, from *Pharm. Centralbl.*

Unguentum Hydrargyri Nitratis—Experiments with Different Fats as a Base.—Mr. Charles Wolf Reichard has made a series of experiments, following the process of the *Pharmacopœia* for 1880, but using different kinds of fats. 76 parts of the fat were heated to 70°C., when 7 parts of nitric acid, of the proper strength, were added without stirring, but with continuing the heat as long as a moderate effervescence took place; when nearly cool, the warm solution of 7 parts of mercury in 10 parts of nitric acid was added and stirred. In each case the degree of absence of effervescence, change of color and other changes were noted, as was also the color, odor and consistence of the preparation as soon as it had become cold, about an hour after the mercury solution had been added to the fat. Similar observations were afterwards made at regular intervals. The fats used were (1) castor oil, (2) neats' foot oil, (3) linseed oil, (4) vaseline, (5) cosmoline, (6) oleic acid, (6) sweet almond oil, (8) lard oil, (9) cotton seed oil, (10) lard, (11) lard and lard oil, (12) lard and cotton seed oil, (13) lard oil and sweet almond oil, (14) castor oil and

sweet almond oil, and (15) butter. The author has tabulated his results, and has arrived at the conclusion that the present base for citrine ointment, lard oil, though not being perfect in all respects, has the fewest objectionable features, and that its adoption is a decided step toward perfection.—Amer. Jour. Phar., Sept., 1883, 438-440.

Boroglyceride Ointment—Formula.—Mr. Wm. S. Flint recommends the following formula for an ointment of boroglyceride:

Boroglyceride	30 parts.
Glycerin	20 "
White wax	10 "
Petrolatum	60 "

Melt the boroglyceride with the glycerin and add the wax previously melted with the petrolatum; stir until cold.—Amer. Drug., March, 1884, 41.

Tar Ointment—Preparation.—Mr. Thos. S. Wiegand suggests that this ointment is made much easier and smoother by using two drachms of oil of tar with six drachms of simple cerate.—Amer. Jour. Phar., Jan. 1884, 8.

Strawberry Pomade—Preparation.—The following formula is given in "New Remedies" (July, 1883, 207):

Fresh, ripe strawberries	4 parts.
Fresh lard	25 "
Fresh tallow	5 "
Alkanet	q. s.
Oil of rose	q. s.

The strawberries are put on a straining cloth and the lard and tallow previously melted and heated to 100° C. (212° F.) and tinted red with alkanet poured over them. The strained mass is stirred until it begins to set, and for each two pounds of product, one drop of oil of rose added.

Ointment for Preparing Animal Skins—Preparation.—One hundred and twenty-five parts of colocynth and 25 parts of aloes are to be boiled with 1,500 parts of water to one-half, and the liquid filtered while hot. In another vessel, 500 parts of brown resin-soap and 250 parts of soft soap are made to a thin paste with water, with the aid of a gentle heat. To this mixture is then added the former, and besides 125 parts of glycerin and 40 of rape oil. 50 parts of naphthalin having previously been triturated to a fine powder with 35 parts of oil of turpentine, and 80 parts of liquefied carbolic acid, are finally added, and the whole well mixed so as to form a homogeneous mass, which may be easily rubbed in. If too thick, it may be diluted with oil of turpentine. Being less poisonous than arsenic ointment, the above preparation would seem to deserve the preference.—New Rem., Aug., 1883, 248, from Rundschau, Leitmeritz.

MISCELLANEOUS APPARATUS AND OPERATIONS.

Stop-Cocks—Novel Construction.—A simple stop-cock, in which the liquid to be drawn off comes in contact only with India-rubber and glass, may be constructed, according to J. Sobieczky, in the following manner (see Fig. 23).

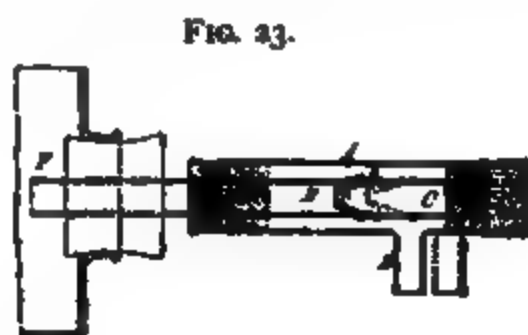


FIG. 23.

Stop-Cock.

FIG. 24 B.



Stop-Cock.

A glass tube *A*, about eighteen millimeters (three-quarter inch) wide, is provided with a lateral branch *D*. Another smaller tube *C* is conically contracted at one end, and covered with a piece of India-rubber tubing *S*. *K* is a piece of cork fitted inside of a tube *D*, and gliding easily to and fro upon tube *B*, which latter is connected with the reservoir containing the liquid, and the outer end of which is made somewhat flaring so as to fit exactly to the conical end of tube *C*. The cork *K* fits tightly on to *C*. If the faucet is to be opened, the outer tube *A* is pushed backwards, whereby the conical end of tube *C* sets free the orifice of *B*, and the liquid escapes through *D*.—*Zeitschr. f. Anal. Chem.* 1883, 229.

A method even simpler than the above is taken from another German authority and illustrated in Fig 24 B. The smaller tube having been closed at the end with the blow-pipe, has an opening filed in its side. The two tubes are joined by a sleeve of pure rubber tubing, and when it is desired to arrest the flow of liquid, the inner tube is drawn out until the opening is covered by the rubber sleeve.—*New Rem.*, Aug. 1883, 242.

An Apparatus for Producing Small Crystals, described in *New Rem.* (Sep. 1883, 264), is illustrated by the accompanying cut (Fig. 25). A

FIG. 25.

double-walled tank or vat *b* is so constructed that it can be rotated about a central axis *e*. It is provided with an eccentrically attached stirring-apparatus *k*, and immovable scraper *q*, which prevent the adhesion of the crystalline flour to the bottom or walls of the vat. The stirring apparatus receives its motion from the same transmission *d*, which also rotates the vat. The latter rests upon small rollers *f*, which cause it to have a constant, moderate vibration, and thereby help to produce a finely-granular mass of crystals. Through the hollow axis, *e*, cold water enters between the double walls of the vat, the excess of which escapes through *i* into a reservoir surrounding the vat, and from there flows off through *g*.

Duplicate Prescription Checks.—Mr. H. P. Reynolds draws attention to a new form of prescription checks, shown in the following, which seems to be very practical :

REYNOLDS' PHARMACY. — PRESCRIPTION CHECK.	680	REYNOLDS' PHARMACY. — PRESCRIPTION CHECK.	680	PRESCRIPTION DEPARTMENT, REYNOLDS' PHARMACY. PLAINFIELD, N. J. <hr/> Please present this check when calling for your prescription.	680
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The coupons only are gummed, and are so scored in printing as to be easily torn off. When a prescription is received, the check is handed to the customer, and the coupons are affixed to the prescription by moistening one of them, the other being left projecting. When the medicine is made up and wrapped, the duplicate coupon is detached and gummed on the outside of the wrapper to await the presentation of the check. In practice a strong but not too thick linen paper has been found best adapted to the purpose.—*Amer. Drug.* Feb. 1884, 23.

Coating for Flasks and Retorts to Withstand High Heat.—It is customary, in laboratories, to coat glass or porcelain-vessels which are to be exposed to a high heat, whereby the glass might be liable to fuse or the vessel be fractured if exposed to a sudden draught of cold air, with clay, either alone, or mixed with cow-hair or asbestos to make it more cohesive. But this coating, though very cheap has the fault of easily cracking and peeling off, thereby causing a fracture of the vessel.

According to Eugene Schaal it is much better to coat such vessels with a mixture of infusorial earth and water glass. If properly applied, this will last for weeks; it is inexpensive, and so effective that the coating even permitted to continue the use of some retorts previously covered with it, which had accidentally been fractured afterwards. It is of importance to make the mixture so that it forms an elastic, soft dough, but

not liable to run. A mixture of 1 part of infusorial earth and 4 to 4½ parts of water glass (silicate of soda) will about produce such a dough. It is not practicable to give exact proportions, since the water glass of the market varies considerably, and even the infusorial earth varies in moisture. The portion of the vessel to be protected is coated with the dough to a depth of ½ to 1 centimeter, and the vessel then exposed to a moderate temperature in a drying oven or on a retort stand over the oven. If the temperature is raised too high in the beginning, the mass becomes porous from bubbles. However, if the bubbles are compressed with the fingers, as soon as they are seen to form the vessel may be dried even over a naked flame, by constantly keeping it in motion over it. Should any fissures make their appearance, some of the plastic mass is smeared over them and dried again. If any part of the vessel is to remain transparent, water glass may be applied in several successive layers, each of which must be allowed to dry before a fresh one is applied.—*New Rem.*, August 1883, 236, from *Deutsche Ind. Zeit.*, 1883, 147.

Yellow Glass Bottles—Superiority over Blue Glass for Pharmaceutical Preparations.—Dr. F. Molnar has put to spectroscopic proof the question that has been long debated, whether the blue glass bottles so constantly used in pharmacies protect their contents from the chemical action of light. He found that the blue or cobalt glass allowed to pass part of the red rays of sunlight, and all the blue and violet. The yellowish-brown bottle-glass permitted the passage of the red and orange rays only, the green, blue, and violet rays being completely stopped. A second experiment was made with chloride of silver paper. A piece of paper was taken, a third covered with cobalt glass, a third with the brown glass, a third left unprotected, and the whole exposed to the sunlight. After ten minutes it was found that the part covered by the blue glass was almost as much darkened as that left uncovered, while the discoloration had not yet begun under the brown glass. It is well known that the blue, violet, and ultra-violet rays are the most active chemically, and these experiments show that the blue glass bottles now in use are best adapted for promoting chemical action in their contents. The details are published in the *Chem. and Drug.* from *Gyogysz. Hetilap.*—*Amer. Drug.* May, 1884, 86.

Stock Bottles—Convenient Labeling.—A correspondent of *Amer. Drug.* (Sept., 1884, 75), recommends the following plan of marking stock bottles, as for instance, in the case of tincture of capsicum:

U. S. P. 1880.
TINCT. CAPSICI.
W. B. 20 oz. av.
W. P. 25 " "
W. T. 45 " "

W. B. signifies weight of the bottle; W. P. weight of percolate, and

W. T. total weight. Once done, it never requires repetition, so long as the bottle lasts.

Labels—Method of Attaching to Tin, Zinc or Glass.—Water-glass (solution of silicate of soda) is recommended as a very good adhesive for this purpose, particularly if the articles are subsequently liable of being exposed to heat. Metallic surfaces should first be rubbed with emery paper before applying the paste; the label is then pressed on with the hand.—*Drug. Zeit.*—New Rem., Aug., 1883, 246.

COLLODIUM.

Collodion—Useful Combinations.—Mr. J. B. Barnes has read an interesting paper before the British Pharmaceutical Conference, 1883, on various combinations of collodion, in which numerous instances are mentioned where collodion may probably be used advantageously for the topical application of medicaments. Among these may be mentioned: wood tar (1.4); coal tar (in syrupy alcoholic solution); juniper tar (1.5); oil of gurjun (1.4); oleic acid and various oleates; Peruvian balsam, extract of belladonna, aconitine, atropine, hyoscyamine, morphine, etc., etc.—*Yearbook of Pharmacy*, 1883, 578–580.

ELIXIRS.

Elixirs.—Method of Preparing *Cinchona Alkaloids* entering into their composition. See under “Organic Bases.”

Elixir of Gentian with Tincture of Chloride of Iron—Process of Preparation.—Mr. D. M. R. Culbreth gives the details of some experiments, as the result of which he communicates the following formula and process for preparing elixir of gentian with tincture of chloride of iron:

Gentian root, powdered	1 ounce.
Fresh orange peel, grated	4 drachms.
Coriander seed	2 drachms.
Alcohol	24 ounces.
Water	8 ounces.
Simple syrup	2 pints.
Tincture of ferric chloride	2 ounces.
Citrate of potassa	2 drachms.

Percolate the drugs with the mixture of alcohol and water until two pints are obtained. Dissolve the citrate of potassa in half an ounce of water, and add this to the tincture of iron. Now add this to the simple syrup, mix, and add the mixture to the percolate.—*Drug. Circ.*, June 1884, 83.

Blackberry Cordial—Preparation.—

{ Dried blackberries	16 ounces troy.
{ Or fresh blackberries	4 pints.

Powdered blackberry root	12	ounces.
Powdered mace.	1 ½	ounces.
Powdered cassia	9	drachms.
Powdered allspice and cloves, of each	5	drachms.
Sugar	60	ounces troy.
Brandy	2	pints.
Port wine	1 ½	pints.
Alcohol	1	pint.
Water.	q. s.	

Soak the berries, if dry, in *q. s.* of water, and express, and repeat until 6½ pints of juice are obtained. If the berries are fresh, express the juice, and mix water with residue, to wash out all juice; then add water to make it measure 6½ pints. Mix the spirit with 6½ pints of juice; moisten the powders with this mixture, and pack in a percolator. Allow it to drain, and pour on water until percolate measures 10 pints; then add the sugar, dissolve, and, if necessary, filter.—New Rem., August 1883, 247, from The Pharmacist.

Hop Cordial—Formula.—The following is recommended as a palatable preparation in "Pop. Science News":

Hops	2	oz.
Dandelion	2	oz.
Gentian	2	oz.
Chamomile.	2	oz.
Stillingia.	2	oz.
Orange peel	2	oz.
Alcohol, water, of each.	77	fl. oz.
Syrup, simple.	12	fl. oz.

Exhaust the solids with the alcohol and water, and add the syrup.—New Rem., August 1883, 247.

EXTRACTA.

Extract of Red Cinchona—New Process of Preparation.—Professor Redwood, on the basis of his observations relating to the proper method of extracting cinchona bark (see under "Materia Medica"), gives the following method for preparing extract of red cinchona. Take of: red cinchona bark, in No. 50 powder, 1 pound; distilled water, 4 pints; hydrochloric acid, ½ fluid ounce. Mix and macerate at a temperature of 180° F. for four hours, stirring frequently, and replacing the water that evaporates. Allow the mixture to cool; then transfer it to a percolator, and when the liquid ceases to pass, carefully introduce distilled water on the surface of the solid matter in the percolator, and continue to percolate slowly until ten pints of liquid have passed, or it is found that what is passing has ceased to give a precipitate on the addition to it of an excess of *liquor soda*.

Evaporate the percolated liquid, at the heat of a water-bath, until it is reduced to one pint. Let it cool; then add three pints of distilled water; stir them together while a precipitate is forming; separate the precipitate by filtration; well wash the filter and its contents with distilled water; evaporate the whole of the filtered liquid at a temperature not exceeding 180° F. until it has acquired a syrupy consistence, and dry this either in thin laminæ, on the surface of glass, or in thicker masses by exposing it in shallow dishes in a drying closet.

Dissolve 20 grains of this extract in a fluid ounce of distilled water, and add three fluid drachms of *liquor sodæ*. Mix thoroughly, and let it stand for twelve hours, that the precipitate may subside. Collect the precipitate on a filter, wash it first with distilled water rendered alkaline with *liquor sodæ*, and finally with water alone, and when it has drained, transfer it to a dish and dry it at 212° F. Its weight multiplied by five will represent the percentage of total alkaloids in the extract.

The resulting extract will dissolve clear in water, and whether prepared from a thick flat bark—rich in quinovic and cinchonic red—or from thin young bark, these worthless constituents having been removed by the dilution with water after the preliminary evaporation, it will be uniform, or nearly so, in its character.—Phar. Jour. and Trans., April 5, 1884, 797–798.

Mr. A. J. Cownley has prepared solid and liquid extract of red cinchona, employing for the preparation a sample of bark the alkaloidal strength of which had been previously determined. A liquid extract prepared from this bark by a process capable of extracting all the alkaloids in it, and standardized so that 1 fluid ounce would correspond to 1 ounce of the bark, would contain $29\frac{1}{2}$ grains of total alkaloid per fluid ounce, with the several alkaloids in the following proportions: Quinine, 9.2 grains; cinchonidine, 7.0 grs.; cinchonine, 8.9 grs.; amorphous alkaloids, 4.4 grs. This would be rather more than 5 per cent.—the proportion recommended by Professor Redwood.

Mr. Cownley prepared first, as required by Prof. Redwood's formula, the extract. He found that after ten pints of liquid had been obtained from one pound of the bark, the percolate still gave a precipitate with caustic soda, and percolation was therefore continued until $13\frac{3}{4}$ pints of liquid were obtained. The dry extract thus produced weighed $4\frac{1}{4}$ ounces, and was found to contain 12.96 per cent. of total alkaloids. To make from this dry extract a liquid extract containing 5 per cent. of total alkaloids, $168\frac{3}{4}$ grains would be necessary for one fluidounce; or to make a liquid extract representing the alkaloidal strength of one ounce of the original bark in the fluid ounce, $227\frac{1}{2}$ grains of dry extract would have to be used. It was shown, therefore, that during the process of preparing the extract, nearly one-half of the total alkaloids contained in the bark failed to enter into its composition; and it was subsequently

proved that in this deficiency, quinine and the more important alkaloids were largely in the preponderance. Further experiments showed that a small percentage of quinine was lost by precipitation, when water was added to the evaporated percolates during the preparation of the extract (see under "Pharmacy"), but that the bark, after treatment according to Professor Redwood's method, retains 4.49 per cent. of total alkaloid. The following table gives the results:

	One pound of bark contained	Precipitated by water.	Solid Extract of cinchona $4\frac{1}{2}$ ozs. contained	Residual bark contained
Quinine	147 grains.	1.1 grains.	64.57 grains.	81.33 grains.
Cinchonidine	112 grains.	. . . . .	64.70 grains.	47.30 grains.
Cinchonine	142.25 grains.	. . . . .	62.30 grains.	79.95 grains.
Amorphous alkaloid .	70. grains.	. . . . .	48.03 grains.	21.97 grains.
	471.25 grains.	1.1 grains.	239.60 grains.	230.55 grains.

Ibid, May 3, 1884, 877, 888.

In reply to Mr. Cownley's criticism, Professor Redwood states that he has used, in his experiment, a succirubra bark which had assayed 4.8% of total alkaloid, and that the dry extract prepared from this contained a quantity of total alkaloid corresponding to 4.3 % of the bark used. In another experiment, since made, very similar results were obtained. He had not used barks containing as high a percentage of alkaloid as that used by Mr. Cownley, and considers it possible that for such a bark a correspondingly large quantity of hydrochloric acid would have to be used. He draws attention to the importance of using a fine powder, and that the fact that Mr. Cownley found it necessary to continue percolation much further than he has done, raises a doubt whether Mr. Cownley used a bark in sufficiently fine powder. Ibid, May 10, 915.

Extract of Nux Vomica—Standard Preparation.—In continuation of their paper on nux vomica and its preparations (see Proceedings 1883, 122), Messrs. Wyndham R. Dunstan and F. W. Short communicate the results of further investigation, made with a view to determining a process for an extract of uniform strength and quality. Without entering into details, the following is the process recommended by the authors for the preparation of a "standard extract of nux vomica:"

Take of Nux vomica, in fine powder 1 pound.
 Rectified spirit 64 fluid ounces.
 Distilled water 16 fluid ounces.

Mix the spirit with the water, and make the nux vomica into a paste with one pint of the mixture. Allow this to macerate for twelve hours, then transfer to a percolator and add another pint of the mixture. When this has percolated, pour on the remainder of the diluted spirit in successive portions; press the marc, filter the expressed liquid and add it to

the percolate. Take of this liquid one fluidounce and estimate the amount of total alkaloid in the following way: Evaporate almost to dryness over a water bath, dissolve the residue in two fluid drachms of chloroform and half a fluidounce of dilute sulphuric acid, with an equal bulk of water, agitate and warm gently. When the liquids have separated draw off the chloroform and add to the acid liquid excess of solution of ammonia and half a fluidounce of chloroform, well agitate, gently warm, and after the liquids have completely separated, transfer the chloroform to a weighed dish, evaporate over a water-bath and dry for one hour at 212° F. Allow the residue of total alkaloid to cool, and then weigh. Take of the percolate as much as contains $131\frac{1}{4}$ grains of total alkaloid, and evaporate over a water-bath until the extract weighs two ounces. This extract will contain 15 per cent. of total alkaloid.

Ten grains of this extract when treated in the following manner should yield one and a half grains of total alkaloid. Dissolve the extract in half a fluidounce of water with the aid of a gentle heat and add a drachm of carbonate of sodium previously dissolved in half a fluidounce of water; add half a fluidounce of chloroform, agitate, warm gently, and separate the chloroform. Add to this half a fluid ounce of dilute sulphuric acid, with an equal bulk of water, again agitate, warm, and separate the acid liquid from the chloroform. To this acid liquid add now an excess of ammonia and agitate with half a fluidounce of chloroform; when the liquids have separated transfer the chloroform to a weighed dish and evaporate the chloroform over a water-bath. Dry the residue for one hour and weigh.—Amer. Jour. Phar. April 1884, 199–203—Pharm. Jour. Trans., February 9, 1884.

Extract of Nux Vomica—Alkaloidal Strength.—Messrs. Wyndham R. Dunstan and F. W. Short have determined the percentage of alkaloid in twelve commercial samples of extract of nux vomica. In each case the amount of moisture, the total alkaloid, and the strychnine, were determined by direct experiment, the amount of brucine being determined by difference. The methods were those previously described by the authors (see Proceedings 1883), and the results were as follows:

No.	Percentage of Moisture.	Percentage of Total Alkaloid.	Percentage of Strychnine.	Percentage of Brucine.
1	16.7	15.15	6.63	8.52
2	19.7	15.64	7.44	8.20
3	15.5	10.32	4.19	6.13
4	15.7	15.16	7.08	8.08
5	16.0	12.49	5.53	6.96
6	13.9	12.53	5.17	7.36
7	13.8	12.25	4.87	7.38
8	17.8	17.54	7.52	10.02
9	13.6	15.78	6.41	9.37
10	16.0	15.94	6.84	9.10
11	17.3	16.24	5.81	10.43
12	15.9	17.12	8.58	8.54

These analyses indicate a serious want of uniformity in the alkaloidal content, and the variation may arise from at least two causes: (1) the difference in alkaloidal content among the seeds of commerce; (2) the practice, which might appear from some observations subsequently recorded to be far from uncommon, of removing the oil which separates during the manufacture of the extract. The presence of oil in an extract may easily be detected by warming with water or dilute alcohol, and upon cooling the oil will separate and float upon the surface of the liquid. Some of the commercial extracts, the analysis of which has been given above, failed to yield more than a mere trace of oil when tested in this way. This may be due either to the abstraction of oil during manufacture, or to the use of a very dilute spirit in the preparation of the extract. If the absence of the oil is due to this second cause, and a spirit about the strength of proof spirit has been employed in the manufacture of the extract, from results obtained in connection with the preparation of tincture of nux vomica (which see), more alkaloid should be extracted in this way. In the case of one of the extracts examined, namely, that which is richest in total alkaloid, this would seem to be the case, for the authors found that this extract contained no oil; although this result might have been brought about by the actual removal of the oil during manufacture, the quantity of oil removed being large in proportion to the small quantity of alkaloid which it contains.—Phar. Jour. Trans. Dec. 8, 1883—Amer. Jour. Phar., Jan. 1884, 37-39.

Extracts of Licorice—Examination.—Mr. Luther J. Schroeder has examined eight samples of liquorice, comprising the most prominent brands of foreign manufacture as well as several of American make. The examination was confined to the determination of matter insoluble in cold water, of glycyrrhizin soluble in water and of glycyrrhizin soluble in ammonia. 500 grains of (air-dry?) extract of glycyrrhiza were macerated in 12 fluidounces of cold water for 24 hours, the mixture was transferred to a filter, and the insoluble matter well washed until the filtrate passed colorless, dried (at what temperature?) and weighed. The residue of No. 1 was lightest in color and very smooth; 5 and 6 were somewhat darker and the others were much darker and gritty. The filtrates (diluted to a uniform amount?) likewise varied much in color and taste, those from 1, 5 and 6 being dark colored and of a fine flavor, and the remainder lighter colored and less pleasant; that from 8 had a peculiar acrid taste. These filtrates (without further concentration?) were precipitated with diluted sulphuric acid, the precipitates collected upon a filter, washed with acidulated water, redissolved in ammonia and reprecipitated by sulphuric acid, this operation being repeated several times; the precipitate was finally washed and dried.

The portion insoluble in cold water was treated with diluted ammonia, the filtrate precipitated by diluted acid, and the precipitate purified by

redissolving and reprecipitating several times, taking care to frequently filter to take out impurities (?). The results are tabulated as follows, 500 grains being used in each case :

Brand.	Residue.		Glycyrrhizin.		
	Weight.	Per cent.	Soluble.	Insoluble.	Total.
	Grains.				Grains.
1. M. & R	180	36	38	5	43
2. Y. & S.	174	34.8	30	10	40
3. Dean	239	47.8	8	5	13
4. Royal	274	54.8	6	3	9
5. Corrigliano	150	30	15	15	30
6. Guzzolini	132	26.4	10	7	17
7. P. & S.	125	25	10	11	21
8. S. C.	130	26	. . .	13	13

Am. Jour. Phar., June 1884, 311.

Referring to the results of Mr. Schroeder, Professor Maisch observes that although absolute correctness is not claimed for them, they nevertheless appear to possess considerable pharmaceutical interest. Since uncombined glycyrrhizin is sparingly soluble, not entirely insoluble, in cold water, and dissolves freely in boiling water, it is evident that the loss of this compound has been the greater the more frequently purification was attempted by re-solution in ammonia and reprecipitation by acid. Sestini, in 1878, showed that fresh liquorice root containing 48.7 per cent. of moisture yielded 3.27 per cent. of glycyrrhizin, which is equal to 6.37 per cent. for the dry root. Delondre in 1856 obtained from liquorice root by successive treatment with cold water, boiling water, and steam, 15, 7.5, and 16, or a total of 38.5 per cent. of extract, which, if all the glycyrrhizin is present, would contain about 16.5 per cent. of this compound. The largest amount obtained by Mr. Schroeder's process was 8.6 per cent. A portion of this deficiency is due to the water present in the commercial extract, which Madsen (see Proceedings, 1882, 76) found to vary between 10.5 and 16.5 per cent.

The U. S. Pharmacopœia requires that not less than 60 per cent. of the extract should be soluble in cold water. The water naturally present in the extract is obviously included in the soluble matter. The German Pharmacopœia states that 100 parts of the extract, dried at 100° C., must leave a residue weighing at least 83 parts (= not over 17 per cent. of moisture); and when the air dry extract is exhausted with water of not more than 50° C., the insoluble residue, after being dried in the water-bath, should not exceed 25 per cent. Calculated for the dried extract, the limit of insoluble matter is 30 per cent., and the requirement of the U. S. Pharmacopœia should likewise be interpreted as being for the extract dried at 100° C. But if it be conceded that the pharmaceutical,

and perhaps also the medicinal value of extract of liquorice depends upon the glycyrrhizin, the percentage of soluble matter alone can give no indication of the correct value ; and a process for accurately estimating the glycyrrhizin is still unknown.—*Ibid.*, 302-313.

Extractum Ferri Pomatum—Cause of Granular Condition.—This extract has been observed in a granular condition by E. Mylius, who found it to contain 17.94 per cent. of anhydrous ferrous succinate, of which salt 1.235 parts are soluble in 100 parts of water. It is probable that fermentation set in during the digestion of the apple juice with iron ; at least Hager states that under this condition, an unsightly granular extract is obtained.—*Amer. Jour. Phar.*, Aug. 1883, 402 ; *Phar. Centralhalle*, May 31, 1883.

Extract of Calabar Bean—Value in Obstinate Constipation.—This extract has been recommended as an heroic remedy in obstinate constipation. Recent experiments undertaken in the service of Prof. Leyden, of Berlin ("Deutsche Medic. Woch.,") demonstrate that this extract has a very rapid and sure action in atonic states of the intestine, characterized by flatulence, meteorism occurring just after meals, a sensation of weight in the epigastrium, habitual constipation, etc. The medicament was given in this form : .

R. Ext. calabar bean 1 centigram.
Glycerin 30 grams.
M. S.—Ten drops, daily.

The patients are greatly relieved, but the benefit is rarely durable, and if the remedy is continued for any length of time, toxic accidents are apt to supervene.—*Amer. Jour. Phar.*, Sept. 1883, 473 ; from *Med. and Surg. Rep.*, May 5, 1883.

Extract of Canella Alba—Preparation.—See *Canella Alba* under "Materia Medica."

Extract of Wheat Flour.—Dr. B. Hirsch states that the dried extract of wheat flour, which is known as Gehe's, is prepared in the following manner :

Wheat Flour 100 parts.
Malt, ground 100 "
Pure Bicarbonate of Potassium 2.5 "
Water, a sufficient quantity.

Mix the wheat flour with 200 parts of water to a paste, then add the malt and 800 parts of water, and heat to a temperature of 65° C. (149° F.) under constant stirring during two and a half to three hours until a sample, in a test-tube, when covered with a layer of tincture of iodine, no longer shows the presence of starch. Then add the bicarbonate of potassium, previously dissolved in water, heat the whole to 100° C. (212° F.),

and keep it at a full boil for about ten minutes. Then allow to settle, siphon off the clear liquid, drain the residue on a strainer, and evaporate the liquid in a vacuum apparatus to a thick extract. Finally evaporate the latter in small portions to dryness.

The product is a light yellowish to reddish-brown, somewhat hygroscopic lamellar powder, readily soluble in water to a nearly clear liquid. It has an agreeable, sweet taste and is rich in protein bodies.

The directions for making this valuable preparation are, in the main, the same which were published by Liebig, about twenty years ago, for making his "infant's soup." But, while the latter was in liquid form, quickly becoming acid and not keeping over twenty-four hours, and moreover its preparation on a small scale was not always successful, the process of Gehe & Co., of Dresden, furnishes a preparation of uniform quality and of almost unlimited keeping qualities, if properly preserved. It differs from the so-called "infants' flour (kindermehl)," which is much in use, by not containing either milk, eggs, sugar, or undissolved starch.

The same firm also furnishes a pulverulent extract of malt of a whitish, and a pulverulent extract of leguminous seeds, of a yellowish color, both prepared by a process similar to the above. The chief constituents of these three dietary substances, so valuable both for children and convalescents, are the following (according to E. Geissler).

Constituents.	Extract of.		
	Wheat Flour.	Malt.	Leguminous Seeds.
Carbohydrates, soluble	86.50	88.50	77.00
Among them sugar	25.06	32.02	28.08
Among them dextrin	60.05	56.00	47.05
Carbohydrates, insoluble	0.61	0.42	2.00
Protein bodies	6.53	7.02	13.45
Salts	2.10	1.64	5.30
Phosphoric acid	0.81	0.55	0.88
Fats	0.20	0.22	0.30
Water	4.06	2.02	1.95

Amer. Drug., April 1884, 73.

Extract of Meat—Determination of Quality.—The following process for the examination of Liebig's extract of meat, according to R. Sendtner, leads to satisfactory results, and is based upon the determinations of ashes, water and the extract, soluble in 80 per cent. alcohol. These determinations are resorted to in the Hygienic Institute in Munich. To determine the amount of ashes, 1 gramme of meat extract is burnt at a white heat. The presence of cooking salt would at once be manifest in the proportions of matter resulting from the subsequent determinations. To determine the percentage of water, 2 grammes of sample extract are

dried for 36 hours at a temperature of 100° C. Determination of extract, soluble in 80 per cent. alcohol, is conducted in this manner: two grammes of sample are dissolved in 9 c.c. of water, to which 50 c.c. alcohol 93° is added, causing a heavy precipitate, and strongly adhering to the glass vessel; the alcohol is then poured off and the precipitated substance is washed out with 50 c.c. alcohol of 80° . The combined alcoholic extract is then dried for 6 hours at a temperature of 100° C. With an unadulterated article, the ash is found to be between 22 and 25 per cent., the water between 16 and 21 per cent., and finally the alcoholic extract between 56 and 65 per cent.—Pharm. Rec., May 1, 1884, 194; from Archiv f. Hygiene 1, 511.

Powdered Extract of Meat—Preparation.—Reber gives the following directions for preparing this article of invalid food, which is now used with considerable success in the superalimentation (or forced alimentation) of consumptives.

Lean beef is finely chopped, then boiled for 15 to 30 minutes in a well-covered or tightly closed vessel on a steam bath and, while still hot, strongly pressed. The cake, thus freed from fat and juice, is completely dried at between 90° and 100° C. (194° to 212° F.), and powdered. The liquid previously expressed is allowed to cool, the separated fat removed, then evaporated and dried as much as possible. But, since the residue is very hygroscopic, it cannot be powdered alone, but is mixed with rice or pea-flour, then powdered, and finally mixed with the powdered meat. Thus prepared the product contains all the constituents of the beef excepting the fat. Besides, it has a very pleasant odor of roasted meat. It costs about one-quarter more than the beef itself.—New Rem., Aug. 1883, 248; from Pharm. Centralh., and Rundschau, Leitmeritz.

Euonymin—Character of the Commercial Article, and Preparation.—Mr. Paul Thibault remarks that the method said to be used in the preparation of the “resinoid” euonymin, namely, precipitation of the concentrated alcoholic tincture by cold water, cannot be the true one, because it actually yields only minute traces of a precipitate, and the latter differs entirely from the commercial article.

The author states that there are three different euonymins met with in the market, which he thus describes:

1. *Brown Euonymin.* A brownish-gray powder, of a peculiar taste, producing copious salivation when applied to the tongue. It is very hygroscopic, entirely soluble in water, to which it imparts a deep brown color; less soluble in alcohol and ether. Its solution is slightly precipitated by phosphomolybdate of ammonium, but neither by the double iodide of mercury and potassium, nor by acids or diluted ammonia. Ferric chloride colors it deep brown. It strongly reduces Fehling's solution.

2. *Green Euonymin, A.* A green powder, of the same taste as the preceding, and equally hygrometric. Almost entirely soluble in water. The insoluble residue consists of chlorophyll. When deprived of this coloring matter by ether, it behaves towards solvents and reagents exactly like brown euonymin.

3. *Green Euonymin, B.* A greenish, odorless powder, of very bitter taste, soluble in alcohol and petroleum, insoluble in carbon disulphide, only partly soluble in ether and chloroform.

Having ascertained that the alleged process of preparation could not be the one actually followed, the author made experiments and succeeded in obtaining products apparently identical with the commercial ones. His method of proceeding is as follows:

1. BROWN EUONYMIN.

Moisten one part of the powdered bark of the root of euonymus with one-half part of alcohol of sixty per cent., pack it in a percolator, and, after twenty-four hours, pour on five and one-half parts of alcohol of sixty per cent., and collect the percolate, displacing the alcohol gradually by water. Recover the alcohol from the percolate, filter the residue, and evaporate it on the water-bath to a syrupy consistence. Then add a little sugar of milk to prevent the separation of some fatty and resinous substances. Mix intimately, dry in a warm place, powder, and transfer to dry and well-closed bottles.

2. GREEN EUONYMIN, A.

Proceed exactly as in the preceding case, except that the evaporation and drying must be conducted at a temperature not exceeding 60° C. (140° F.). The product will then have the color of the chlorophyll which is contained in the herbaceous layer of the bark.

3. GREEN EUONYMIN, B.

To judge from the properties of this article, as described by Dr. Conil, it would seem as if it were prepared by exhausting euonymus twigs by means of light petroleum oils, with the aid of heat, then distilling off the petroleum, and evaporating to dryness. This preparation is very little active.

The therapeutic reputation acquired by euonymin is based on the *brown* variety above described. And this is the only kind which should be used in medicine.—New Rem., Oct. 1883, 294, from Jour. de Phar. et de Chim. (5) VIII. 113.

EXTRACTA FLUIDA.

Liquid Extract of Red Cinchona—New Process of Preparation.—Professor Redwood proposes the following formula for preparing the liquid extract of red cinchona, which is based on his observations relative to the most suitable extraction of the bark with an aqueous menstrum (see *Red*

Cinchona Bark, under "Materia Medica"): Take of extract of red cinchona (see under "Extracta"), as much as contains of total alkaloids, 437.5 grains; distilled water, a sufficiency; rectified spirit, 5 fluidounces. Dissolve the extract with the aid of a gentle heat in twelve ounces of the water; when cold add the spirit, make up the volume to 20 fluidounces by further addition of water, and filter.

The resulting preparation contains a definite proportion of the total alkaloids of the bark (and any low grade bark can therefore be employed for the preparation of the extract to be used for this purpose), and will mix clear with water. A fluidounce of the preparation may be considered equivalent to, and to contain all the valuable medicinal properties of an ounce of red cinchona bark of good average quality.—Phar. Jour. and Trans., April 5, 1884, 797-798.

Fluid Extract of Wild Cherry Bark—Modification of Official Process.—Mr. J. W. Landis considers the proportion of glycerin in the water to be used for the preliminary maceration of the bark too great, and suggests the following process, which illustrates at the same time the process of repercolation as advocated by some writers:

Wild Cherry Bark, 500 grammes.
Water (temp. 100° F.),
Alcohol (95°),
Glycerin—of each a sufficient quantity.

Mix 200 c.c. of warm water (temp. 100° F.) with 50 c.c. of glycerin, and moisten the powder with the whole of this mixture. Pack the moistened powder moderately into a closely covered vessel, and allow it to macerate for four days or 96 hours. Repack firmly into two percolators, and pour on No. 1 a mixture composed of alcohol (95°) 360 c.c., glycerin, 250 c.c., and water 250 c.c. Set aside the first 250 c.c., and when the mixture has all passed from the surface, continue the percolation with water until 600 c.c. more are obtained; pour this upon percolator No. 2, and when 190 c.c. have passed, mix it with the 250 c.c. reserved from No. 1, put into a well-stoppered bottle and protect it from the light. Continue the percolation of percolator No. 2, with water, until 400 c.c. more are obtained, and preserve this for next lot of extract. In making another lot of extract, at some subsequent time, this 400 c.c. is poured upon percolator No. 1 first, and then followed by 460 c.c. more of the alcohol, glycerin, and water mixture, and from each percolator in this operation, or from each 250 grammes of the powder, 250 c.c. of extract are obtained; but the percolation of percolator No. 2 is continued at each operation until 400 c.c. are obtained, which is set aside for the next operation. This process is that known as fractional percolation, but any other good process of extraction might answer equally as well, provided no evaporation is required, and the bark is completely exhausted.

The principal points to be observed in the formula are :

First. The proper degree of fineness of the powdered bark.

Second. The heating of the water, and the proper proportion of glycerin used in that portion of the menstruum with which the bark is macerated.

Third. The length of time for maceration.

Fourth. The proportion of alcohol, glycerin, and water used to exhaust the bark ; and

Fifth. The careful preservation of the extract, when finished.—Pharm. Rec., July 1, 1883, 232, from Proc. Penna. Phar. Asso.

Fluid Extract of Columbo—Proper Menstruum.—According to G. W. Kennedy the best menstruum for exhausting columbo, both for fluid extract and for tincture is a mixture composed of 70 parts alcohol, 15 parts glycerin, and 15 parts water ; the percolation for fluid extract being finished with a mixture of 7 alcohol and 3 water.—Amer. Jour. Phar., Aug. 1883, 302.

Fluid Extract of Senega—Modified Formula.—Mr. Clay W. Holmes, after enumerating the objections to the officinal and other formulas for the preparation of this fluid extract, communicates the following as the result of his experiments, the success depending upon following the steps in the process as below given :

Sixteen troy ounces of senega root, ground to the proper degree of fineness, were moistened thoroughly with dilute alcohol, packed moderately in a percolator, and allowed to stand four days. Percolation was then proceeded with, dilute alcohol being used as the menstruum, until the root was exhausted. The percolate was then evaporated slowly in a water bath at a temperature below 105° F., until reduced to eleven fluid ounces. This evaporate was transferred to a moist filter and allowed to drain. The soft mass remaining was washed with water by means of a spritz, until the filtrate measured fifteen fluid ounces. One ounce of alcohol was then added to raise the whole to sixteen fluid ounces.

The author exhibited examples of the fluid extract so made, which retains its limpidity, had a good color and odor, and an external appearance that was all that could be desired.—New Rem., July 1883, 195, from Proc. New York State Phar. Assoc., 1883.

Prof. P. W. Bedford read a paper on the same subject, from which it appears that if the alcoholic percolate is heated to the boiling point and then allowed to stand twelve hours, the pectous matters are precipitated, and may be filtered out completely. He, however, recommends the process of the Phar., 1880, as answering the purpose perfectly, the pectous substance being held in solution by the ammonia added.—Ibid., p. 196.

Fluid Extract of Senega—Improved Formula.—Mr. H. J. Rose finds that by the addition of a portion of spirit of nitrous ether to the menstruum, fluid extract of senega will represent the active constituents of the

drug perfectly, and will not gelatinize. The menstruum is composed as follows: alcohol, 7 parts; spirit of nitrous ether, 2 parts; water, 7 parts. The process is that of the U. S. P.—Can. Phar. Jour., August 1883.

Fluid Extract Canella Alba—Preparation.—See *Canella Alba* under “Materia Medica.”

INFUSA ET DECOCTA.

Decoctions and Infusions—Filtration and Preservation.—Mr. J. A. Hislop constructs a filter out of two funnels, one a little larger than the other, about two feet of india-rubber tubing $\frac{3}{8}$ of an inch in diameter, a sponge, $\frac{1}{4}$ yard of flannel, and the same of lint.

To the lower end of the larger funnel, which is supported by the ring of a retort stand, is attached the india-rubber tubing, and to the other end of the tubing is fastened the small funnel inverted. Over the larger funnel is now tied a portion of the flannel cut to a suitable size and shape, which retains the larger pieces of solid matter of the infusion. In the small funnel is inserted a sponge, large enough to occupy the whole space, and the mouth is securely closed with a piece of lint. The infusion or decoction being now poured into the upper funnel passes rapidly down the tube, and the weight of the column is sufficient to force the liquid quickly through the sponge and the lint, which retain the smaller particles of matter, and allow only a bright and sparkling fluid to filter through.—Amer. Drugg., May 1884, 93, from Chem. and Drug.

Infusion of Cinchona—Reaction with Acetate of Potassium.—Mr. H. P. Reynolds draws attention to the incompatibility of infusion of cinchona and acetate of potassium. The infusion, containing free sulphuric acid, and the alkaloids consequently as sulphates, decompose the acetate of potassium, and acetate of quinine is formed. This being very sparingly soluble rises to the surface of the liquid in the form of a thick reddish scum, leaving the liquid below clear and almost colorless. Obviously, when the two are prescribed together, filtration of the turbid liquid should not be resorted to.—Drugg. Circ., July 1883, 98.

GLYCERITA.

Glycerite of Tar—Formula.—Mr. Thomas S. Wiegand observes that the omission of this glycerite from the new Pharmacopœia renders desirable a preparation that may be made without difficulty, and that will enable the pharmacist to furnish the various liquid preparations into which tar enters in a cleanly, easy and expeditious manner. The glycerite made by the following formula being miscible with water in all proportions, and yielding a clear liquid, commends itself to the favorable consideration of pharmacists:

Oil of tar	f. ʒi
Alcohol	f. ʒij
Glycerin and water, each.	f. ʒiv
Magnesium carbonate, q. s., or.	ʒvi.

Mix the oil of tar with the alcohol, and rub these thoroughly with the magnesia to a smooth paste; to this add the glycerin and water previously mixed together; put the mixture into a well-corked bottle, and let it remain for several days, shaking it frequently; then filter through paper.—*Amer. Jour. Phar.*, January 1884, 8.

Glycerite of Corrosive Sublimate—A Substitute for Blue Ointment.—R. Vigier recommends four or five parts of corrosive sublimate dissolved in one hundred parts of glycerin, in place of mercurial ointment, for parasites of the skin. It has been known for a long time that glycerin is not absorbed by the skin, and that it also prevents the absorption of medicines, and to a great extent that of corrosive sublimate. Therefore, on account of its greater cleanliness, and greater security from the absorption of mercurials, it is to be preferred to blue ointment.—*New Rem.*, July 1883, 201, from *Pharmaceutische Centralhalle*, *Pharm. Record*.

LIQUORES.

Hypodermic Solution—Preparation.—Mr. N. W. Yeakle, in a paper read before the Indiana Pharmaceutical Association at its last meeting, recommends, for prudential reasons, more care than is sometimes used in the making of solutions for hypodermic use. Not infrequently impure water, as well as a dirty needle may be blamable for resulting abscesses. But when the pharmacist has taken all possible precautions, this blame cannot be laid at his door.

The method recommended by Mr. Yeakle is, to keep on hand for immediate use, a few small vials of carbolated distilled water (1 to 1,000). In making a solution, he first half fills a vial with a two-per-cent solution permanganate of potassium, and with the aid of a Bunsen flame brings it to a boiling point, so as to hasten the oxidation of organic matter that the vial may contain. Rinse the vial well with distilled water. Then put the prepared medicated solution in the vial, and bring the contents to as high a temperature as the drug will permit without deterioration, and work. Mr. Yeakle has such solutions which, after eight months, show no indication of decomposition or organic contamination.—*New Rem.*, Sept. 1883, 277.

Solution of Gum Arabic—Extemporaneous Preparation.—Dr. E. R. Squibb, in his very interesting article on "Gum Arabic," draws attention to the importance—long recognized by careful pharmacists—of preparing solutions of gum arabic (mucilage, etc.) extemporaneously. It is important, however, that the *granulated* gum arabic—now so generally used for this purpose—should be a properly prepared article. It should be made by coarsely grinding the first picked true acacia until it all passes through a number 50 sieve. The finer particles are then all taken out of this coarse powder by careful and thorough use of a number 80 sieve, which leaves a very uniform, clean, coarse powder, very suitable

for making solutions of the gum. Drug. Circ., July 1883, 100, from "Ephemeris."

Solution of Citrate of Magnesia—Formula.—The following formula is recommended by B. Kondratowisch in the *Pharm. Zeitsch. f. Russl.* :

Dissolve 5 ounces of citric acid and $1\frac{1}{2}$ ounces of calcined magnesia in 8 pounds of water, and filter; then add 14 ounces of syrup and 6 drops of citric acid(?), previously triturated with $\frac{1}{4}$ ounce of sugar. Distribute the whole into nine bottles, and finally add to each 50 grains of bicarbonate of sodium, and 20 grains of citric acid in as few crystals as possible. Cork quickly, and tie.—New Rem., Aug. 1883, 246.

Solution of Valerianate of Ammonium—Odorless and Tasteless Preparation.—Mr. R. Rother recommends the following as producing an odorless and tasteless solution of valerianate of ammonium containing about two grains of that salt in a fluid drachm.

Ammonium valerianate cryst..	119 grains.
Borax	191 grains.
Water of ammonia.	
Distilled water, of each sufficient.	

Mix the valerianate with one fluidounce of distilled water, and add water of ammonia, drop by drop, until a clear and slightly alkaline solution is produced. Then add two fluidounces of distilled water and the previously powdered borax, and when all has dissolved, excepting a few contaminating crystals of calcium borate, add distilled water to the measure of eight fluidounces, and filter the solution.—Amer. Jour. Phar., June 1884, 313-315.

Lime Water—Causes of Inferiority.—Mr. Thomas Maben has made some very interesting experiments on the solubility of calcic hydrate in water (which see under "Calcium"), which lead him to some practical conclusions in reference to the causes of inferiority of lime water. Thus he found that lime water can be made of full strength if the calcic hydrate is mixed with even 15 per cent. of calcic carbonate; with equal parts of hydrate and carbonate the lime water contains 0.5 grain of CaO per fluidounce, with 75 per cent. carbonate, 0.4 grain; but with 90 per cent. carbonate, the lime water contains only 0.1 grain of CaO per fluidounce. The quality of the lime water therefore depends upon the character of the slaked lime, which, if long kept, or carelessly stored, may contain so large a percentage of carbonate as to cause the formation of a weak lime water.

The author, furthermore, draws attention to an inaccuracy of the U. S. Phar., which states that "the alkaline reaction of the liquid entirely disappears after it has been saturated with carbonic acid gas, and the excess of the latter has been expelled by boiling (abs. of alkalies or their carbonates)." This, however, is not so; the liquid after boiling is still alka-

line, though of course not to any large extent, and the test as it stands is therefore worthless.—*Amer. Jour. Phar.*, Feb. 1884, 110–114, from *Phar. Jour. Trans.*, Dec. 29, 1884.

Solution of Hypophosphites—New Formula.—Dr. G. S. Gerhard recommends the following formula:

R. Calcii hypophosph.	
Potassii hypophosph.	
Sodii hypophosph.	aa gr. j
Quiniae hypophosph.	
Mangan. hypophosph.	aa gr. $\frac{1}{4}$
Ferri hypophosph.	gr. $\frac{1}{2}$
Strychniae hypophosph.	gr. $\frac{1}{16}$
Glycerini.	℥ iij
Liq. acid. hyposulph.	℥ ij
Aq.	ad. f3j.

The addition of a definite amount of hyposulphurous acid prevents the precipitation of the salts of iron and manganese. The solution is clear, slightly fluorescent, and pleasantly acid. Two minims of acid. phosphoric. dilut., B. P., if substituted for the hyposulphuric acid in the above formula, appear to be equally efficacious in preventing precipitation. If the iron and manganese are omitted, a few drops of dilute hydrobromic acid serve to maintain the other ingredients in clear and permanent solution.—*Phar. Jour. and Trans.*, February 2, 1884, 607, from *Med. Times*, January 26, 1884.

Solution of Chloride of Iron—Modified Process.—Mr. C. W. Weise, of Berlin, writes to the *Pharmaceutische Zeitung* that he has been led, through the annoyance caused by the fumes of acid when following the officinal process for making *Liquor Ferri Chloridi*, to abandon the use of acids and to substitute for it a current of chlorine gas.

For this purpose it is only necessary to observe the following precautions: The solution of ferrous chloride is diluted with two parts of water, transferred to a capacious, colored (amber-colored) bottle, and a current of washed chlorine, derived from a *cold* mixture of manganese dioxide and hydrochloric acid, passed into the solution until a small portion, tested with ferricyanide of potassium, no longer shows the presence of ferrous salt. The solution is then evaporated on the water-bath, in order to remove the excess of chlorine, and brought to the proper specific gravity. It should be observed that it is highly advantageous to have the chlorine delivered from a *cold* mixture of the ingredients, since this prevents the aspiration of the solution into the chlorine apparatus, and further, since the slow evolution of gas facilitates its total absorption.

The author also remarks that the solution should be carefully kept from the light, since even reflected sun-light exerts a reducing action upon the solution.—*New Rem.*, August 1883, 247.

Solution of Ferrous Iodide—Preparation.—Dr. Uggeri Francesco suggests the following as a permanent solution of ferrous iodide, which is particularly intended for preparing Dupasquier's syrup of iodide of iron (see *Syrup*).

Iodine, resublimed	8 parts
Iron, in powder	2.5 parts
Glycerin, pure, 30° B	90 parts.

Weigh the glycerin and the iodine into a porcelain capsule and heat the mixture on a water-bath until the iodine is dissolved. Now add the iron in small portions at a time, constantly stirring, and keep the temperature at 80° C. (176° F.). Fifteen minutes after the reaction is terminated, and the liquid has acquired a dark-green color, set the capsule aside so that the excess of iron may deposit. Then decant the liquid carefully into a glass-stoppered bottle and set this aside. After a few days the remaining suspended iron will settle to the bottom, so that the clear liquid may be decanted. The liquid is too dense to make filtration advisable, except with the aid of a rapid-filtering apparatus.

The solution thus prepared has a green color verging to black when in bulk; it has a sweet, astringent and ferruginous taste, and is free from odor. It is miscible with water in all proportions and contains 10 per cent. of ferrous iodide. In this form, the solution keeps perfectly.—*Amer. Drugg.*, April 1884, 67, from *Bolletino Farm.*, 1883, 155.

Traumaticine—Composition, etc.—Mr. R. Modlen draws attention to this preparation, which has been introduced by Professor Auspitz, of Vienna, as a substitute for the gelatin solution usually employed as a vehicle for medicaments which are to be applied in skin diseases. "Traumaticine" is in fact a solution of one part of gutta-percha in ten parts of chloroform. It forms an admirable adhesive, and continues unchanged and adherent to the skin for some days. It produces a very thin, delicate film, causes neither tension nor pain, as gelatin does, and is quite permanent, whereas the gelatin becomes mouldy. In preparing it, Mr. Modlen dissolves the medicament, e. g., acidum chrysophanicum, in the chloroform, and then the gutta-percha. Gutta-percha tissue, he finds, will answer quite as well as purified gutta-percha.—*Phar. Jour. and Trans.*, Mar. 3, 1883, 341.

Phosphorated Solution of Albuminate of Iron.—L. Feichtmayer proposes to prepare this compound in the following manner:

The white of one egg (which should be as fresh as possible) is dissolved in 500 grammes of distilled water, the solution mixed with ten grammes of ethereal tincture of chloride of iron, decolorized by light, and finally with four drops of a one-per-cent. solution of phosphorus in ether.

If the preparation is not needed immediately, it should be allowed to

stand for twenty-four hours and then filtered.—Amer. Drug., May 1884, 96; from Pharm. Centralh.

Hydrargyrum Formamidatum Solutum—*A New Mercurial for Hypodermic Use*.—Prof. O. Liebreich has devised a preparation of mercury which is especially serviceable for hypodermic use. He announced his discovery at a recent meeting of the Berlin Medical Society. The name of the new compound is formamid of mercury, or *hydrargyrum formamidatum solutum*. Liebreich has found that about thirty injections of a one per cent. solution suffice for ordinary cases of syphilis. Given internally, the drug is inert.—Amer. Jour. Phar., July 1883, 366, from Amer. Pract.

Fehling's Solution—*Permanent Preparation*.—Mr. Sonnerat states that he has succeeded in preparing Fehling's solution so that it will not deteriorate for several years even if exposed to light. The whole secret consists in making and mixing the solutions *while cold*. He gives the following directions:

Dissolve 34.639 gm. of pure, crystallized sulphate of copper in just sufficient distilled water in the *cold*. Also dissolve, in the *cold*, 173 gm. of pure and crystallized tartrate of potassium in 600 gm. of solution of caustic soda, spec. grav. 1.120. Add the copper solution very gradually to the alkaline solution, and make up to one liter with distilled water.—New Rem., September 1883, 278, from Jour. de Pharm. (5), viii., 28.

Solution of Carbolic Acid—*Preparation for Disinfecting Purposes*.—Dr. Squibb recommends a 2 per cent. solution of the crude carbolic acid of the U. S. P., in water for disinfecting purposes. It is a clean colorless solution, entirely volatile, and does not injure clothing, carpets, bedding, or anything of the kind, and therefore it may be sprinkled upon anything, however nice.—Drug. Circ., September 1883, 132, from "Ephemeris."

Wickersheimer's Wine-Preserving Liquid—*Composition*.—According to a report of Dr. J. Moritz (in *Chemiker Zeit.*, No. 29), the preparation sold in the market under the title, "J. Wickersheimer's Weinconservierungs-Flüssigkeit," and which is put up in two separate vials, consists of a 10 per cent. alcoholic solution of salicylic acid in one vial, and a solution of boracic acid in glycerin in the other. The accompanying directions prescribe to mix 37 cubic-centimeters of the first-named solution ("Solution A") with 63 cubic-centimeters of the second ("Solution B"), and to add this to 100 liters (26½ gall.) of the wine. Each quart, therefore, will contain about $\frac{1}{3}$ grain of salicylic acid, which quantity is certainly entirely harmless.—New Rem., August 1883, 247.

MISTURÆ.

Emulsion of Cod-Liver Oil—*New Formula*.—Mr. C. F. Schleussner adds another formula to the many already offered for the preparation of cod-liver oil emulsion. In the following the addition of the flavoring is left to the discretion of the manipulator:

Powdered gum arabic	180 grains.
Powdered tragacanth	180 grains.
Powdered arrow-root	180 grains.
Cod liver oil	24 fluid ounces.
Syrup	4 fluid ounces.
Water	20 fluid ounces.

The manipulation should follow *exactly* the following directions: The powders are rubbed in a porcelain mortar of eight ounces capacity with a small quantity of cod-liver oil to a thin smooth paste, more oil being gradually added until four or six ounces have been added, when it is to be poured into a five-pint bottle, *which must be clean and perfectly dry*; more oil is then put into the mortar to rinse it, and poured from it into the bottle, adding the balance of the oil. The bottle is then to be vigorously shaken to distribute the powder thoroughly through oil, then add *twelve* fluid ounces of water *all at once*, and shake the bottle *thoroughly, vigorously, and continuously for ten minutes*, when the remaining quantity of water and syrup may be added *all at once*, and the shaking again continued for about two or three minutes.—Pharm. Rec., Mar. 1, 1884, 101.

Emulsion of Cod-Liver Oil—Formula.—Mr. Reinhard Lucke makes some general observations on emulsion of cod-liver oil, and recommends the following modification of the one known as the “College formula” (New York College of Pharmacy?—Rep.):

Irish moss	2 ½ troy oz.
Water	6 pints.
Boil down to	4 “
And strain. Then mix in the usual manner with	
Cod-liver oil	q. s.
Oil of bitter Almonds	1 drachm.
Oil of Gaultheria	½ “
Oil of Cinnamon	15 drops.
Alcohol	4 fl. oz.
Hypophosphite of Calcium	1 troy oz.
Hyphoposphite of Sodium	1 “
Chloride of Sodium	1 drachm.
Boiling water	8 fl. oz.
Glycerin	1 ½ pints.
Water, enough to make a 50 per cent emulsion.	

The fifty-per-cent. emulsion obtained, measures from 1¾–2 gallons. An emulsion properly prepared after this formula yields a product which leaves nothing to be desired. It is a perfect emulsion: no oil globules can be detected by the naked eye; it is very fluid; it is of a milk-white color and has an agreeable flavor, and it never separates; a number of bottles filled with this emulsion showed no change after having been kept in the store for nearly one year.

It is important that this decoction of Irish moss be well prepared.

The moss is thoroughly washed with cold water, then slowly heated with water to the boiling point, and stirred constantly to prevent burning and to hasten evaporation. When evaporated down to about four pints, it is forcibly strained through coarse muslin into a large open vessel, and then, while hot, about one or two pints of oil are added and beaten into an emulsion, and afterwards more oil is added in small quantities at a time (one-half pint) till it will no longer emulsify, when a small quantity of reserved decoction is added, and the whole will then make a perfect emulsion. The aromatic oils, dissolved in the alcohol, are then added, afterwards the glycerin, and at last the salts, dissolved in the boiling water, are duly incorporated with the emulsion.—Amer. Drug., May 1884, 84.

Castor Oil and Glycerin Mixture—Formula, Etc.—Dr. William Soper claims that glycerin increases the purgative power of castor oil when given with it. The following is the formula in use in the hospital of the University of Pennsylvania :

R. Ol. ricini
Glycerini aa f. ℥j.
Ol. menthæ piperitæ gtt. ij.

M.

New Rem. Nov. 1883, 345, from Lancet and Chem. and Drug.

Glycerin Mixture.—Jacoud's formula for a glycerin mixture, recommended in cases where cod-liver oil is not well tolerated, is made as follows :

R. Glycerini 3 x.
Sp. vini gall. or rum ℥iv.
Ol. menth. piperitæ gtt. j.

M.

This quantity may be divided into two or three doses, and taken just after or between meals.

This mixture has an agreeable taste, is facile of digestion, and does not cause disgust, even after having been used several months without intermission. Prof. Jacoud has obtained marked benefit from its use in several cases of phthisis.—Med. and Surg. Rep., July 28, 1883 ; Amer. Jour. Phar., Nov. 1883, 577.

Camphor Mixture—Formula.—The following formula for a camphor mixture, in which the camphor may be perfectly suspended, and which is intended to be used in form of enema, is given in "Gazette Hebdom.:" Camphor, 1 part ; powdered gum arabic, 2 parts ; decoction of linseed, 250 parts ; yolk of egg, No. 1. (The parts probably meaning grams, Rep.)—Drug. Circ., Dec. 1883, 177.

Musk Mixture.—The difficulty with which musk is reduced to powder, under ordinary circumstances, has induced P. Vigier to search for an im-

proved method of preparing a mixture in which musk shall be suspended in a finely-divided condition.

This may be done by triturating musk with four times its weight of 95 per cent. alcohol in a marble mortar, when it will be reduced to an impalpable powder in two or three minutes. It may then gradually be triturated with water and with syrup. When the mixture is properly made, the musk will require several hours before it will be deposited at the bottom. He quotes the following proportions as an example of such a mixture, in which the quantity of musk, however, is to be varied by the physician according to the circumstances of the case :

Musk	1 gm.
Alcohol, 95 %	4 "
Syrup	30 "
Distilled water	100 "

Amer. Drug., Feb. 1884, 26 from Journ. de Chim. et Pharm., 1883, 240.

Pomegranate Mixture—Preparation.—Mr. Louis Siebold, with a view to meeting the objection to the usual form of administration of this drug, succeeded in making a mixture which is free from nauseous taste and action, whilst it possesses the full activity of the drug. The preparation has a fruity flavor, and is readily taken by the most fastidious patient. The process of preparation is as follows :

Six ounces of the coarsely powdered root-bark are digested three successive times with 48 fluidounces of water at 160° F., previously acidified with a few drops of acetic acid, each time for about twelve hours, during which the mixture should be frequently agitated and the temperature maintained at or near the point given. The strained infusions, measuring in all nearly 140 fluidounces, are united, and gradually mixed with solution of sugar of lead until no further precipitate is formed on testing filtered portions; the whole is then filtered, the slight excess of lead removed from the filtrate by a current of washed sulphuretted hydrogen, the mixture warmed for some time to expel the excess of the gas, and again filtered, and the perfectly clear liquor evaporated on a water-bath to the consistence of a syrup, at a temperature not exceeding 140° F. Evaporation *in vacuo* would probably be better still; but this was not tried. Finally the small quantity of residue left is mixed with syrup of orange peel sufficient to produce a draught of about two fluidounces. This draught represents a dose for an adult, and should be taken at once, first thing in the morning, the patient abstaining from food and keeping quiet for about four hours after the administration. A diet of meat and fish, without bread or farinaceous food of any kind, should be observed for the two days preceding the cure, and on the last day no food whatever should be taken after dinner. During this afternoon it is also advis-

able to clear the bowels by means of a mild purgative; if then the draught be taken at about two or three o'clock the following morning, and sleep again resorted to after its administration, the patient will have done all he can to ensure success.—Pharm. Jour. Tran., Nov. 17, 1883; Amer. Jour. Pharm., Jan. 1884, 29–31.

Tannate of Quinine Mixtures.—It is well known that tannate of quinine cannot be minutely divided or brought to the condition of a milk by mere trituration with water or syrup. Since this salt is so little soluble, its therapeutic activity should be augmented by as fine a division as possible.

G. Weiss recommends to accomplish this in the following manner: one part of tannate of quinine, one part of syrup, and one and one-half parts of alcohol are rubbed together, when complete solution will take place. The requisite amount of water is now added, whereby the tannate of quinine is again precipitated in form of an emulsion, being suspended in a very finely divided condition.—Amer. Drug., March 1884, 49, from Pharm. Zeit., August 29th.

Paraldehyde Mixtures.—Mr. Sutter finds rum to be the most advantageous corrigent for masking the taste, and he gives the following formula which he says yields a mixture resembling cold punch:

	Gm.	About
Paraldehyde	100	3 fl. oz.
Jamaica rum	150–200	5 to 7 fl. oz.
Tinct. of lemon or orange peel	10	$\frac{1}{3}$ fl. oz.
Syrup	300	8 fl. oz.
Water.	1390–1440	45 to 47 fl. oz.
Dose	100 gm.	about 3 fl. oz.

For the administration of paraldehyde as a clyster he recommends a mixture in the proportion of one part of paraldehyde to two parts of olive oil. Hellwig speaks favorably of two mixtures: (a) paraldehyde, 3; ol. olivæ, 15; ol. menth. pip., gtt. 3; and (b) paraldehyde, 3; spiritus, 6; syr. simp., 8; and tinct. vanillæ, 2. But he prefers an emulsion of paraldehyde, 3; mucil. gum. acac. and syr. cort. aurant. aa 8, with the addition of two or three drops of ol. menth. pip.—Amer. Drug., June 1884, 108; Pharm. Jour., from Pharm. Ztg., April 1884.

Emulsion of Paraldehyde.—It is stated (Am. Drug., May 1884, 88), that the best method of giving paraldehyde is in form of emulsion. A sufficient quantity of powdered acacia is made into thick mucilage with water and a little paraldehyde added. The mixture is stirred until it has become perfectly homogeneous, after which another small quantity of water and of paraldehyde are added. This alternate addition of water and paraldehyde is continued until as much of the latter has been added as the amount of acacia originally taken. If the last addition of paralde-

hyde has not disturbed the homogeneity of the emulsion, enough water is added to produce 100 parts of product for every 10 parts of acacia or of paraldehyde taken. To the 100 parts thus produced, 20 parts of syrup of almond are added. The dose of this emulsion is one fluidounce, to be repeated, if necessary, after half an hour.

Chlorate of Potash Mixtures.—Mr. John Rutherford Hill observes that it is a common practice to prescribe gargles, mouth-washes, and mixtures containing a much larger proportion of chlorate of potash than the aqueous menstruum is capable of dissolving. In most instances the finest powdered chlorate of potash has a tendency to assume a crystalline condition, and the mixtures soon become unfit for use. A number of substances were employed by the author to overcome this tendency, but none of them had the effect of preventing crystallization, and a single day's exposure to the variable temperature of a sitting-room was sufficient to produce such an alteration of the chlorate as to render the gargle, etc., unfit for use. Treacle, tragacanth and honey seemed to have a slight influence in retarding the process of crystallization; the crystals formed in these mixtures being of somewhat smaller size. They failed, however, to accomplish the object in view, which was not simply retardation but prevention.

The author suggests that whenever an excess of chlorate of potash is required in a mixture, it should always be prescribed in the form of powder. The patient could be directed to add the requisite quantity of water at the time of using; there would be no risk from crystallization, and the dose would be uniform. By this means both difficulties would be completely disposed of, and it would be, in every respect, a more excellent way.—*Amer. Jour. Phar.*, March 1884, 138-141, from *Phar. Jour. and Trans.*, Jan. 26, p. 594.

Dr. Fothergill's Asthma Mixture.—

R.	Tinct. lobeliæ	℥ v.
	Ammonii iodidi	℥ ij.
	Ammonii bromidi	℥ ij.
	Syr. tolutani	℥ ij.
M.	Teaspoonful every one, two, three, or four hours.	

This gives relief in a few minutes, and sometimes the relief is permanent.—*Weekly Medical Review*, Oct. 13. *Am. Jour. Phar.*, Dec. 1883, 630.

PILULÆ.

Pill Coating.—Mr. Luther F. Stevens describes a practical, cheap method for constructing an apparatus for coating pills with gelatin, and gives explicit directions, accompanied by illustrations, both for the construction of the apparatus and the coating of the pills. The paper will be read with interest.—See *New Rem.*, July 1883, 198-198; from *Pharm. Record*.

Phosphorus Pill Mass—Preparation.—Mr. D. E. Holt communicates the following formula for making a phosphorus mass, which may be kept in stock and serve a useful purpose in making the pills extemporaneously. Scrape a stick of phosphorus under water, and cut ten grains from the transparent part. Melt 390 grains of cacao butter in a bottle that will just contain it, leaving a very small air space; introduce the phosphorus, wiping it dry on bibulous paper, cork the bottle tight, and heat in a water-bath, shaking the mixture vigorously from time to time. When the phosphorus has ceased to dissolve, remove the bottle from the water-bath, and shake until cold, aiding the cooling off by dipping the bottle in water occasionally.—Drug. Circ., Dec. 1883, 180.

Quinine Pills—Method of Examination.—Mr. J. F. Carl Jungk recommends the following method as best adapted to the examination of quinine pills: The pills are rubbed into a smooth paste with a little water, two drops of diluted sulphuric acid being added for each grain of quinine sulphate. A quantity of recently slaked lime equal to three times the weight of the pills is well mixed with the paste; then the same weight of well-washed and dried fine sand is added; the whole is thoroughly triturated and dried at a moderate heat, when it can be easily powdered and readily removed from the mortar without loss. The fine powder thus obtained is placed in a small glass percolator, which is fixed to an accurately tared flask by means of a twice perforated cork. The percolator is connected with a back-flow cooler, or reversed condenser, such as is used in plant analysis, and which has often been described. For every 20 grains of sulphate of quinine 2 or 3 fluidounces of chloroform are now poured on the powder, or into the flask. The apparatus is then put together, and the flask heated by means of a sand-bath to 70°–80° C.

If the distillation and condensation of the chloroform proceeds regularly, the whole quantity of the quinine will be extracted in about one hour. The apparatus is allowed to cool, a small quantity of chloroform is poured into the percolator, and a drop on coming through evaporated on a watch crystal. If a residue remains, it is dissolved in a little chloroform and put back on the powder, and $\frac{1}{2}$ to 1 fluidounce of chloroform more added. If no residue remains on the crystal, and the drop causes no opacity with diluted acid and a solution of iodide of mercury and potassium, the heating is continued for 10 or 15 minutes longer, so as to be certain that all the quinine has been extracted. Now allow the apparatus to cool, evaporate the chloroform in the tared flask, and dry the residue by means of an air-bath and a moderate heat until the weight remains constant. The residue will represent the amount of quinine, if it answers to the test of pure quinine. If the pills represented 20 grains of quinine sulphate, the residue should weigh 14.86238 grains, or 0.961 gram.

For the further examination of the alkaloid obtained in this manner, the author uses the polariscope according to the manner suggested by Mathias Rosznyay, the exhaustive treatise of the latter on these optical observations being obtainable from Drs. Stern and Reuter, of Homburg, Germany, for the sum of 1 mark.—Amer. Jour. Phar., September 1883, 434-438.

Pills of Iodide of Iron—Process of Preparation.—Mr. Wm. R. Warner, Jr., communicates the following process for making pills of ferrous iodide:

Iodine	4634 grains.
Iron wire	1600 grains.
Sugar	4500 grains.
Marshmallow powder	4500 grains.
Gum	2200 grains.
Iron by hydrogen	566 grains.
Distilled water	3000 grains.

Place the iron wire in a Florence flask, quart capacity, add the water, place on a sand-bath, and gently heat; then add the iodine in such divided portions as the reaction will admit of, without raising the temperature so high as to drive off violet fumes of iodine. Finally add all the iodine, and continue the heat until the reaction has ceased, and the liquid shows no blue color with starch mucilage. The weight of the flask must be previously determined, and at this point the weight of the contents should be 9234 grains; if not, sufficient water must be added to make it so. Now mix thoroughly together the gum, sugar, marshmallow and iron by hydrogen, and strain upon them the contents of the flask; mix quickly, and knead thoroughly, until a pill mass is formed, then divide it into three (3) grain pills, each containing one grain of iodide of iron (iodine, iron and water of crystallization). When the quantity is small, in the hands of the practical dispenser, the pills, after being hardened in a warm, dry atmosphere, covered with starch powder, may be coated with a solution of gum mastic in ether or tolu in alcohol, in the proportion of four drachms to the fluidounce.—An

Extemporaneous Sugar-Coating may be effected to a reasonable degree of perfection in the following manner: Mix together thoroughly, equal quantities of sugar, gum, and starch. Moisten the surface of the pills with an equal mixture of simple syrup and water, and then place them on the powder in a shallow dish, and give the same a centrifugal motion, so that they may be equally coated by the moisture of the syrup, which will agglutinate the particles of the powder. Dexterity attained by practice is necessary to success.—Drug. Circ., Jan. 1884, 4.

PULVERES,

Powdered Ergot—Removal of Fat.—Perret recommends the following process as meeting the requirements of German pharmacy:

The ergot is first dried at 40° C. (104° F.) until it ceases to lose weight. It is then ground and sifted, and the powder once more dried, first at 40° C. (104° F.), then on the water-bath, or at a temperature of 80° C. (176° F.), until the weight remains constant. The powder is then allowed to cool, transferred, when cold, to a percolator, and extracted with ether until a drop of the ethereal percolate ceases to leave a fatty stain on glass. The powder is then pressed, passed through a sieve, and dried a few hours at 35° C. (95° F.), then at 40° C. (104° F.), then at 60° C. (140° F.), 80° C. (176° F.), and finally for a few moments at 100° C. (212° F.). Lastly it is once more passed through a coarser, and when entirely cold through a fine sieve.

It is generally assumed that the powdered ergot, losing under this treatment nearly one-third its weight, should be used in correspondingly smaller doses, the fatty oil being regarded inert. It has been shown, however, by different experimenters, that the fatty oil, whether extracted by ether or by expression, actually possesses tonic properties, and a correction in the dose is, therefore, unnecessary. The powder deprived of fat is shown by Perret to be almost unalterable.—New Rem., Sept. 1883, 271, from Pharm. Ztg.

Granulated Gum Arabic—Proper Preparation.—See *Solutions of Gum Arabic* under "Liquores," page 76.

SPIRITUS.

Spirit of Nitrous Ether, U. S. P.—Composition, etc.—Mr. Henry B. Parsons speaks a good word for the process of the Pharmacopœia of 1880, and thinks that with some modifications the process may be made to yield uniform results. After considering the different reactions that are involved in the process, the author remarks that the use of more nitric acid, in divided portions, might serve to utilize the 17.87 parts of alcohol referred to as wasted. Accordingly, several test experiments were made as follows:

After the first distillation, the mixture in the flask was cooled, a weighed portion of nitric acid was added, and distillation repeated. It was found that five distillations, each time with smaller portions of nitric acid, were necessary to obtain the maximum yield of distillate. The following are the actual results:

	1ST EXPERIMENT.		2D EXPERIMENT.	
	Nitric Acid.	Distillate.	Nitric Acid.	Distillate.
1st distillation	0.800	0.900	0.800	0.900
2d distillation . . . . .	.800	.890	.720	.780
3d distillation . . . . .	.560	.350	.640	.490
4th distillation . . . . .	.400	.140	.400	.100
5th distillation . . . . .	.400	.100	.400	.100
	<hr/>	<hr/>	<hr/>	<hr/>
	2.960	2.380	2.960	2.370
	<hr/>	<hr/>	<hr/>	<hr/>
Water-washed ether		2.210		2.250

It is noticeable that in the first and second distillations, theory is well borne out by the quantitative results, but that later the amount of product does not warrant the belief that the same reaction occurs. Just at this point, also, the workmen employed have always found considerable care necessary to avoid explosion. It is, therefore, hardly profitable or advisable to distill more than twice.

The direction of the Pharmacopœia to "heat rapidly, by means of a water-bath, until strong reaction occurs, and the temperature reaches 80° C. (176° F.)" might, perhaps, be advantageously changed. In almost every case, the reaction begins at 70° C. (158° F.) and continues at that temperature for some time with little or no need of heating. Toward the last, if the heat can be maintained at 70° C., the reaction is completed, and the distillate contains less acetic ether (boiling point 76° C.) and alcohol (boiling point 78° C.) than would be present if the heat were rapidly pushed to 80° and 82° C., as directed by the Pharmacopœia.

The author is by no means disposed to condemn the pharmacopœial process or product, but believes that, with certain modifications as regards details, it may furnish a very uniform and medicinally valuable product. So long as the present Pharmacopœia is in force, it seems hardly advisable to propose a process differing radically from the one now prescribed. It seems, however, that the use of larger amounts of nitric acid (insuring larger yield), and the regulation of the temperature so as not to greatly exceed 70° C. (158° F., the temperature required for the reaction) are allowable modifications, in view of the fact that the washed ether contains less acetic ether than that of the Pharmacopœia.

The author also suggests that those analysts who propose to investigate "sweet spirits of nitre" would do well to first prepare a few pounds, strictly following the directions of the Pharmacopœia, in order that they may try their own standards in the light of practical possibilities. Were this more frequently done, there might be fewer charges of dishonesty from the analysts, and fewer counter-charges of incompetence from the manufacturers.—New Rem., Sept. 1883, 259–260.

Spirit of Nitrous Ether—Commercial Quality.—Mr. W. H. Symons communicates a report on the strength of specimens of spiritus ætheris nitrosi of English commerce, which shows a deficiency of nitrous ether in most specimens; whilst, to judge from the sp. gr. of the samples, the alcohol used in their preparation was of proper strength. The deficiency in nitrous ether is, therefore, evidently due to faulty manipulation, and the author is of the opinion that proper care was not taken in the cooling of the distillates. The author has examined twenty-one specimens, and gives the results in form of a table. One of these is particularly interesting, since it throws some further light upon the composition of the ethereal liquid that is separated when the strong spirit of nitrous ether is

shaken with saturated solution of chloride of calcium. When treated by Eykman's process, which the author finds perfectly reliable, this ethereal liquid was shown to contain about 35% of ethyl nitrite, a spirit made by mixing 10 parts of the separated ethereal liquid and 90 parts of alcohol (sp. gr. 0.834) assaying 3.49% of ethyl nitrite.—Phar. Jour. and Trans., October 13, 1883, 281.

Spirit of Nitrous Ether—New Process.—Mr. A. C. Abraham, in a paper read before the British Pharmaceutical Conference, 1883, states that he has been led to the conviction that the generally received explanation of the official process for spirit of nitrous ether is erroneous, and to impute the moderate action and constant temperature peculiar to that process rather to the action of the sulphuric acid upon nitrate of copper, or to the increase of the boiling point by the admixture of sulphuric acid, than to the formation of nitrous acid. After some experiments in which the copper was first converted into nitrate, the author eventually abandoned this for calcium nitrate, and he gives the following formula for a process which he says presents the advantages over the official one of giving a greater yield at a smaller cost, with a less prolonged, more regular distillation and a smaller quantity to be distilled, whilst the action which takes place is more analogous to that in the older processes:

Nitric acid, $4\frac{1}{2}$ fluidounces; precipitated carbonate of calcium, $3\frac{1}{2}$ ounces; sulphuric acid, 3 fluidounces; rectified spirit, $4\frac{1}{2}$ pints. Place the carbonate of calcium in a flask of about a gallon capacity, pour the nitric acid gradually upon it, and set the flask aside so that the contents may cool. Mix the sulphuric acid with 1 pint of rectified spirit, pour the mixture upon the nitrate of calcium in the flask, and distill into a receiver containing the remainder of the rectified spirit. The product, in the author's experiment, was 4 pounds 10 ounces; the sp. gr. 0.8463, and when shaken with saturated solution of chloride of calcium, from 3–4 per cent. of ether was separated. The author gives a table showing the results obtained by six different methods.—Yearbook of Pharmacy, 1883, 545–554.

Spirit of Nitrous Ether—Utilization of the Reaction with Iodide of Potassium.—Mr. August Drescher draws attention to the fact that the reaction of spirit of nitrous ether with iodide of potassium, which occurs only in the presence of free acid, may be utilized for the detection of free acid in the spirit. If a little iodide of potassium be therefore added to spirit of nitrous ether, followed by starch paste, the well known blue color is developed even in presence of traces of free acid.—Drug. Circ., July 1883, 99.

Cologne Water—Formulas.—F. Eichmann gives the following formulas:

Eau de Cologne, Double.

Oil of petit grain.	42 grams.
" neroli	35 "
" bergamot.	32 "
" Portugal	32 "
" rosemary.	30 "
" lavender	30 "
" orange.	30 "
Jasmin water.	60 "
Orange-flower water.	60 "
Deodorized alcohol.	10 pounds.

Dissolve the oils in the alcohol; then add the waters. Allow the mixture to stand fourteen days, and distill. Transfer the distillate to bottles, and let it stand for at least nine months before using it.

Eau de Cologne, Plain.

	1	2	3	4	5	6
Oil of bergamot. gms.	240	16	40	130	17	100
" lemon. "	80	32	.	30	41	16
" neroli "	20	16	80	25	25	8
" rosemary. "	5	4	40	25	8	.
" lavender. "	5	40	.	15	.	8
" orange (port.). "	.	32	.	30	41	.
" orange (big.). "	.	.	.	30	.	.
" petit grain "	.	5	.	.	8	.
" thyme. "	.	.	.	1	.	.
" melisse. . . . . "	.	.	.	.	.	16
Essence of orange peel "	.	.	40	.	.	.
Essence of lemon peel. "	.	.	100	.	.	.
Orange-flower water lb.	.	$\frac{3}{4}$	.	$\frac{1}{2}$	.	.
Acetic ether gms.	40	.	.	.	.	.
Deodorized alcohol. lb.	10	10	10	10	10	10

New Rem., Aug. 1883, 246, from Der Seifenfabrikant.

Brettfeld Spirit—Formula.—Mr. Ad. Vomáčka employs this spirit in the preparation of "Fumigating Tablets" (which see under *Miscellaneous Formulas*), and give the following formula:—Digest 230 parts of Orris root and 0.15 parts of musk in 2,000 parts of alcohol, filter after sufficient maceration, and add to the filtrate 60 drops each of oil of rose and oil of lemon, and 70 drops of oil of neroli.—New Rem., Dec. 1883, 366—from Phar. Rundschau (Leitmeritz), No. 23. See also Proceedings, 1883, 71, 86.

SUPPOSITORIA.

Suppositories—Use of Plastic Clay.—The use of plastic clay as a convenient material for suppositories in some cases is recommended by Dr. Trippier. The ordinary sculptors' modelling clay is used, the medicaments being dissolved in water, and then worked into a mass; in this way, salts of iron and copper, alum, or even vegetable extracts may be

incorporated by taking proper precautions. Dr. Trippier appears to contemplate supplying patients with the medicated clay, so that they can break off a portion and mould it between the fingers as required. Although the mass may easily be maintained of a proper consistence in a vessel placed in a plate containing water and covered by a bell-glass, it is liable to harden if exposed in the open air; but this may be prevented by the use of glycerin, which is said to have the additional advantage of giving stability to a potassium iodide mixture. The formula given for such a mass is: Clay, 500 grammes; water, 50 grammes; potassium iodide, 30 grammes; glycerin, 100 grammes.—*Amer. Drug.*, Feb. 1884, 32.

Vaginal Gelatin Suppositories—Preparation.—Mr. Ad. Vomacka gives the following instruction for making vaginal gelatin suppositories:

Take transparent gelatin, soak it over night in water, and then add to it six times its weight of glycerin. If the mass is to preserve its transparency for some time, it is necessary to remove all the water which the gelatin has absorbed, by evaporation. According to the density of the glycerin, more or less of gelatin must be used. Nearly all the usual remedies may be mixed with this mass, like iodide of potassium, sulphate of zinc or copper, etc., excepting tannic acid, which forms an insoluble compound with gelatin. If tannic acid is to be applied, it is necessary to replace the gelatin by agar-agar, a Japanese vegetable gelatin, derived from an alga. In the case of agar-agar, however, the relation of glycerin to water is different. Agar-agar does not furnish a jelly with glycerin alone, but forms a transparent mass, which is tough when heated. Hence, an addition of water is here absolutely necessary. 1 part of agar-agar is soaked over night in water, of which it takes up nearly 50 parts, 10 parts of glycerin and 20 more parts of water are then added, and the whole evaporated to the required consistence. During the fusion of the mass, stirring is to be avoided as much as possible. Ascending air-bubbles are to be removed from the surface with a stiff card-board, so as to keep the mass clear and transparent. The prescribed remedies having been added, either in form of solution or in very fine powder, the mass is then poured out into suitable forms and allowed to congeal.—*Amer. Drug.*, May 1884, 85, from *Pharm. Rundschau*.

Medicated Bougies—Preparation.—Mr. J. N. Hurty recommends the following process for making medicated bougies:

Take equal parts of glycerite of starch and powdered white soap, and equal parts of powdered starch and powdered tragacanth. Having thoroughly mixed the first two in a mortar, add sufficient of the starch and tragacanth to give the mass a proper consistence. Roll out a portion to form a bougie which may serve to estimate the weight of the finished product. Add the proper amount of the medicine to be used and, after

thorough mixing, roll out, and form into pencils. Four to five inches in length and two- to three-sixteenths is the usual dimension.

This mass, while sufficiently soluble, is not so quickly melted as cacao-butter, and is quite equal to gelatin. It is superior to the latter in its ease of manipulation, and when tannin or mineral astringents are used.—New Rem., Sept. 1883, 277, from “Indiana Pharmacist.”

SYRUP.

Syrup of Wild Cherry—Modification of U. S. P. Process.—Mr. R. Rother expresses the opinion that the proper preparation of this syrup is generally unduly neglected, and that it is moreover extremely prone to undergo change by the loss of hydrocyanic acid. He therefore favors the addition of hydrocyanic acid of definite strength (which see under *Cyanogen*) to syrup that has lost this important constituent, and, basing this calculation upon the reputed strength of a good bark, gathered in October, computes the quantity to be so added to be equal to about 1% of the officinal dilute hydrocyanic acid. He, furthermore, regards the officinal process to be faulty, and recommends instead the following modification:

Wild cherry in No. 20 powder	12 parts.
Sugar, granulated.	60 “
Alcohol, sufficient, or	4 “
Water, sufficient to make.	100 “

Mix alcohol and water in the proportion of 1 part of the first and 7 parts of the latter, and moisten the wild cherry with 6 parts of this mixture. Pack the moistened bark firmly into a glass percolator, and pour on of the above mixture until the liquid has slowly penetrated to the bottom of the column. Now check the percolation for 24 hours by closing the exit. On resuming the operation let the current slowly flow so that in the course of 12 hours 40 parts of percolate is obtained. Pour three-fourths to four-fifths of this upon the sugar contained in a bottle, and agitate occasionally until no more sugar is dissolved. Decant the clear syrup from the residuary sugar, and pour on this the remainder of the percolate, agitating again as before, until all the sugar has dissolved. Finally mix the two syrupy solutions and strain through a No. 80 sieve.—Amer. Jour. Phar., November 1883, 557–561.

Compound Syrup of Wild Cherry—Formula.—F. H. Hazelton, in answer to an inquirer, suggests that the preparation may be the following:

Fluid extract of wild cherry	2½ fluidounces.
Fluid extract of ipecac	½ fluidounce.
Fluid extract of blood-root	½ fluidounce.
Sulphate of morphine	8 grains.
Tartar emetic	2 grains.
Simple syrup, sufficient to make	1 pint.

The same correspondent says that a syrup claimed to be made according to the foregoing formula, is extensively sold and prescribed in the State of Maine.—New Rem., Aug. 1883, 246.

Syrup of Ginger—New Manipulation.—Mr. Carl Rich suggests the following manipulation for obtaining a clear filtrate with tincture of ginger prescribed, and the water: Scraps of filter paper are placed into a bottle, the tincture is poured on so as to saturate the paper, and the whole is exposed to a temperature below 60° C. to vaporize the alcohol. The water is then added, the whole is shaken repeatedly, allowed to macerate twenty-four hours, and then strained. The pulp is now packed in a percolator upon a small layer of sand, the strained liquid poured on, and the percolation finished by pouring on sufficient water to make the pharmacopœial quantity (from 2 parts of tincture, 35 parts). The syrup is then finished as usual.—Drug. Circ., March 1884, 33.

Syrup of Lactucarium—Improved Process.—Mr. Joseph W. England finds the process for making the fluid extract—from which in its turn the syrup of lactucarium is to be prepared—complicated, troublesome and imperfect, and recommends the following as an entirely satisfactory process for preparing the syrup:

Take of Allen's lactucarium	1 troy ounce.
Powdered quartz	2 troy ounces.
Magnesium carbonate	2 drachms.
Sugar, granulated	13 troy ounces.
Ether	1 ½ fluidounce.
Glycerin	2 fluidounces.
Alcohol dilute	
Water	each, a sufficient quantity.

Reduce the lactucarium to a fine powder with the powdered quartz, macerate for several days with the ether, decant as much as possible of the ethereal solution, add two fluidounces of water, and remove excess of ether by cautious evaporation. When this has been done add to this liquid glycerin two fluidounces. diluted alcohol eight fluidounces, sugar one troy ounce, and magnesium carbonate two drachms.

Place in a tightly-stoppered bottle or flask, digest in a water-bath, at a temperature not exceeding 130° F., for 12 hours. Displace in a glass funnel through absorbent cotton, evaporate the percolate down to 6 fluidounces, make up to 10 fluidounces with dilute alcohol, filter and add 12 troy ounces of sugar to the filtrate, dissolving with the aid of heat. Lastly, add, when cold enough syrup to make the finished product measure 1 pint.—Amer. Jour. Phar., Dec. 1883, 593-595.

Syrup of Lactucarium—Improved Process.—Mr. Nehemiah D. Streeter proposes the following process as a satisfactory substitute for the officinal process for preparing this syrup:

Take of Lactucarium	5 parts.
Ether	5 parts.
Alcohol	3 parts.
Sugar	65 parts.
Orange-flower water and water, of each sufficient.	

To the lactucarium contained in a flask or other vessel capable of being tightly closed, add the ether and macerate with occasional agitation for 24 hours, at the end of which time add 10 parts of water, and, having shaken the flask well, distill off the ether by the immersion of the flask in hot water, heat being continued for a short time after the odor of ether has entirely disappeared; when cool add the alcohol and again macerate for 24 hours, with frequent agitation. Then transfer the contents of the flask to a percolator, and, when the liquid has ceased to pass, gradually pour on orange-flower water until 30 parts of percolate are obtained; set this portion aside and continue the percolation with water until the percolate passes tasteless, evaporate the last portion to 5 parts and add to the portion set aside. Filter the mixture, and pass through the filter a sufficient quantity of orange-flower water to make the filtrate weigh 35 parts. Having placed the sugar in a percolator, pour upon it the menstruum, cover well, and set aside that a syrup may be formed.—Amer. Jour. Phar., August 1883, 393-394.

Syrup of Sulpho-Tartrate of Quinine with Licorice and Coffee.—See under "Alkaloids."

Syrup of Castor Oil—Preparation.—The following formula is taken from the Farmacista Italiana: Picked gum arabic, grams 54; orange-flower water, grams 142. Make a thick mucilage with a portion of the water, and in a marble mortar, mix this with 142 grams of fresh castor-oil until perfectly mixed; add finely-powdered sugar, grams 196; the rest of the orange-flower water and 8 grams of cinnamon-water. After well-mixing in the cold, raise it by a gentle heat to the boiling-point; cool, skim, and preserve.—New Rem., July 1883, 200.

Syrup of Tar—Preparation.—Mr. Wiegand suggests that this syrup be made by mixing together f.℥ij of glycerite of tar (which see under "Glycerites," p. 75), with f.℥xiv. of syrup.—Amer. Jour. Phar., Jan. 1884, 8.

Ferrated Syrup of Oranges—Formula.—The following directions for making an agreeable iron preparation are given in "Bolletín Farmacéutico:" Ten small oranges are cut up and placed in a glass flask or porcelain capsule, with 75 grams of iron turnings and some warm water. The mixture is closely covered, and allowed to stand for 10 or 15 days at a temperature of 25° or 30° C. (=77° to 86° F.), being stirred occasionally. At the end of this time it is expressed and filtered through paper. Half a kilogram of sugar is now added to the clear but slightly colored liquid, and the whole evaporated at a very gentle heat to the con-

sistence of a syrup. It is taken from the fire and 75 grams of lemon water added. When cold it is put in bottles and tightly corked. This orange syrup has a yellowish-brown color, is clear, and has the odor of oranges.—Drug. Cir., Sept. 1883, 129.

Syr. Bromide of Zinc—Preparation.—Complaints having been made that a syrup of bromide of zinc is frequently dispensed in a “milky” condition, Mr. J. N. Hurty directs attention to the fact that by heating the syrup slightly and adding one or two drachms of dilute hydrobromic acid (quantity of syrup not stated.—Rep.), the bromide of zinc will dissolve perfectly.—Drug. Circ., Oct. 1883, 151.

Syrup of Bromide of Nickel—Preparation.—According to Mr. Louis Genois, the syrup of nickel bromide recommended by Dr. Da Costa is most conveniently prepared by direct combination of the elements, and the addition of sugar to the solution obtained. To make it of a strength corresponding to five grains of the salt in each teaspoonful, take of

Bromine	468 grains.
Granulated nickel	172 “
Water	16 fluid ounces.

Mix; promote the reaction by the aid of a very gentle heat; when complete, add

Sugar	24 troy ounces.
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Strain and mix with sufficient syrup to measure one quart.—Pharm. Rec., Jan. 1, 1884, 5.

Syrup of Ferrous Chloride—Preparation.—Mr. Joseph F. Sommerhoff observes that this syrup is best prepared by two methods: *First*, by dissolving iron wire in diluted hydrochloric acid ($\text{Fe} + 2\text{HCl} = \text{FeCl}_2 + \text{H}_2$) and adding the solution thus obtained to thick simple syrup; and *secondly*, mixing together solution of perchloride of iron in certain proportions with glycerin and syrup, and exposing this to the rays of the sun until colorless, when the sugar of the syrup will have changed the ferric to the ferrous chloride.

The first method produces the most permanent and satisfactory result, and may be carried out as follows:

Take of iron (wire)	280 grains.
Hydrochloric acid (C. P.)	552 grains.
Water	4 fluidounces.

Heat them together in a flask of the capacity of 12 fluidounces, and for about six hours at a temperature of 212° F. When the iron is all dissolved, filter the liquid and add to it enough simple syrup to measure 40 fluidounces. The simple syrup is prepared by dissolving 3½ pounds of sugar in 28 fluidounces of water.—Amer. Drug., April 1884, 61.

Syrup of Ferrous Iodide—Dupasquier—Extemporaneous Formula.—Dr. Uggeri Francisco suggests its preparation as follows:

Solution of ferrous iodide (see Liquores, p. 79)	6 parts.
Syrup of orange flower water	24 parts.
Simple syrup	70 parts.

Amer. Drug., April 1884, 17, from Bolletino Farm., 1883, 155.

Syrup of Iodide of Iron—Preservation.—Percy Wells found that glycerin alone would preserve a solution of ferrous iodide, but on mixing it with syrup the usual difficulties were met with. To overcome these, the author now adds about an equal bulk of glycerin to the aqueous solution of the salt, heats to 212° F., and filters into the requisite quantity of cold glucose syrup. After stirring with an iron spatula the mixture will be turbid for about an hour, but afterwards becomes bright and of a very pale green color, and remains unaffected by time or temperature.—Amer. Jour. Phar., Nov. 1883, 561, from Phar. Jour. and Trans., August 4, 1883, p. 82.

Syrup of Iodide of Iron—Preservation.—According to Izard, syrup of iodide of iron may be preserved for a long time with its original green color, if a few drops of alcohol are added during the process, as soon as the iron and iodine have combined. Izard explains this preservative action by the partial withdrawal of hydrogen from the alcohol, whereby aldehyde is formed. The liberated hydrogen reduces any oxide of iron that may have formed.—New Rem., August 1883, 248, from Bull. de la Soc. de Ph. du Sud-Ouest.

Syrup of Calcium Lactophosphate—New Process of Preparation.—Mr. R. Rother recommends the following process for the preparation of this syrup, in which the officinal proportions are maintained as nearly as possible, but which differs in calcium lactate and phosphate being prepared from calcium carbonate. The formula recommends itself on account of its simplicity and the readiness with which the materials are obtainable in a satisfactory condition. It is as follows:

Calcium carbonate	150 parts.
Lactic acid, sufficient, or	360 parts.
Phosphoric acid	196 parts.
Sugar.	6,545 parts.
Water, sufficient for.	10,908 parts.

Mix the lactic acid with 1500 parts of water, and gradually add the calcium carbonate. If the mixture does not become clear, warm it gently, and add lactic acid, drop by drop, until a transparent solution is obtained. To this add the phosphoric acid previously mixed with 1500 parts of water, together with enough more water to make the whole weigh 4,363 parts. Then add the sugar, and when this has dissolved

with frequent stirring, filter the syrup through paper.—Amer. Jour. Phar., December 1883, 607-610.

Syrup of Phosphates of Iron, Quinine and Strychnine (Eaton's Syrup)—*Variation in Commerce*.—In a paper read before the British Pharmaceutical Conference, 1883, Messrs. R. H. Davies and E. B. Schmidt report the results obtained during an examination of several samples of this preparation. It was found that they varied widely in composition among one another and from a sample prepared according to Dr. Eaton's formula—the strychnia, for instance, ranging from 0.6 to 3 grains per 4 fluidounces, the theoretical quantity being 1 grain.—Yearbook of Pharmacy, 1883, 571-576.

Syrup of Phosphate of Lime and Iron—New Formula.—Mr. E. Schürer communicates the following: Prepare a syrup of lime (or saccharate of calcium) from 8 grms. of calcium hydrate, 16 grms. of sugar, and 40 grms. of water. Filter the syrup, and to 42 grms. of it add 55 cc. of water and 345 grms. of phosphoric acid (spec. gr. 1.120), and shake until a clear solution results. Then add 3.25 grms. of carbonate of sodium and 5 grms. of carbonate of potassium dissolved in 10 cc. of water, also 35 cc. of orange flower water, and enough distilled water to bring the mixture to 770 cc. To 605 cc. of this liquid 8 grms. of powdered cochineal are added, and, after the requisite amount of coloring matter has been extracted, the liquid is filtered, and 930 grms. of sugar dissolved in it. To the remainder of the phosphate liquid 29.2 grms. of powdered sulphate of iron are added, dissolved by shaking, and the filtered solution added to the saccharine liquid. Finally, enough syrup is added to make 1030 cc.—New Rem., Sept. 1883, 274, from Phar. Zeit.

TINCTURÆ.

Tinctures—Proposition to Regulate their Strength by a Definite Percentage of Dry Extract.—Mr. H. P. Reynolds, referring to the pharmacœpial method of making tincture of nux vomica, advocates that all tinctures be made to represent a definite quantity of dry extract, believing that while there must be of necessity some variation in the strength of the dry extract, this is not so great as the variation in the crude drug.—Drug. Circ., July 1883, 98.

Tinctures of Fresh Herbs.—A writer in "N. Y. Med. Times" reviews the subject of tinctures prepared from fresh herbs. He concludes that methods will be devised to make preparations from green roots and herbs, of such uniform and standard stamp that they will prove a valuable aid to therapeutics. There are some plants from which tinctures prepared from the green drug are said to be better in their action than those from the dried and preserved drug, and doubtless many others will in time be added to the list. For the preparation of such tinctures, strongly developed, perfect plants should be selected. They should be cut just

above the root leaves, in the morning, shortly before, or just on commencing to flower. Narcotics should be gathered when in full bloom. Roots should be divided into three classes: first, annuals, which are to be cut before the seed ripens; second biennials, in the spring of the second year; and third, perennials, in the autumn. Care should be taken to separate them from any dirt or foreign matter, and that the preparation should be started immediately after gathering the drug.

Nature furnishes undoubtedly the best solvent for the active principles of any drug. They are the vital parts of the plant. They are carried from the root to the stem, from the stem to the leaves and flower, and from the leaves back to the bark. They are found in larger quantities and most active in the living plant. They are found in every cell in perfect solution. The growth of the plant spreads towards the top; each cell in the plant is a perfectly independent department, furnished with a close coat, which surrounds and holds its own fluid. The food for the plant is contained in this cell. The development of the plant is carried on by a process called endosmose, or dialysis, and dialysis would be impossible unless the solution is perfect and the matter in solution a crystalloid. Our fluid extracts and tinctures are never perfect solutions. They are precipitating and changing constantly.

Again, the cells of most plants are so small that it requires a microscope to distinguish them apart. The process of drying shrivels and contracts them into a much smaller compass. The vital principle is confined in the dried cells, which are covered with a hard, tough coat. The powder directed by the pharmacopœias is seldom finer than a No. 80—each one of these must comprise many of the cells, with the active principles, to a great extent, dried and changed from their natural state.

The tendency in medicine is to use the preparation which most thoroughly represents the plant when that is indicated. When the fresh plant is cut and pounded to a pulp, the natural juices or solutions are in the very best possible condition to be treated in the manner which shall furnish a product that will answer the requirements of perfect solution and stability.

The introduction of this class of preparations into the Pharmacopœia of 1880 has given them a position in medicine which at least entitles them to be thoroughly studied and examined; while the indefinite way in which they were placed on the list is in itself an admission of how little the largest class of practicing physicians know of their properties and uses.—New Rem., July 1883, 201.

Tinctures of the Br. Pharm.—Examination of Deposits.—Mr. R. A. Crips has undertaken the examination of the deposits formed in different tinctures with a view of throwing some further light on the question of the activity or non-activity of these deposits. The author's results may be briefly given as follows:

Tinctura Calumbæ.—The deposit contains none of the active principle of the drug, and, except for the inconvenience of filtering, is of no consequence.

Tinctura Cardamomi Composita, and

Tinctura Chloroformi Composita.—The deposits in these tinctures are almost entirely composed of tartrate of calcium.

Tinctura Cinchonæ Composita.—The deposit was found to contain 3.064 per cent. of alkaloids, chiefly cinchonia, probably existing as cinchotanates; and a little coloring matter from the cochineal.

Tinctura Cinchonæ Flavæ.—Three samples were examined, showing that the deposit contains a varying amount of alkaloids, and that, although two of the tinctures were prepared strictly according to the B. P., their nature both physically and chemically was very different.

Tinctura Ferri Acetatis.—The deposit was composed of ferric oxy-acetate.

Tinctura Gentianæ Composita.—The deposit is composed of starch and gentian sugar, mixed with albuminous matter, the first having no doubt slipped through the filter, as starch frequently will.

Tinctura Ipecacuanhæ Concentrata.—The deposit is free from emetine.

Tinctura Lobeliæ Inflatæ Æthera.—The deposit—a somewhat flaky, white sediment, was devoid of lobeline, was soluble in ether, benzol, chloroform, and bisulphide of carbon; insoluble in alcohol.

Tinctura Quiniæ.—The deposit was composed of sulphate of calcium.

Tinctura Rhei.—The deposit contained 2.17 per cent. of chrysophanic acid and about 37 per cent. of oxalate of calcium; the remainder apparently consisting of gummy matters.

The author had opportunity to judge roughly only the amounts of deposit in the following tinctures: Tr. cinchonæ, $\frac{1}{4}$ oz. from 1 gallon; do. 3j. from 1 gallon; tr. calumbæ, 3iss from 1 gallon.—Amer Jour. Phar., Feb. 1883, 101–108, from Phar. Jour. Trans., Dec. 22, 1883.

Tincture of Cinchona, B. P.—Deficiency in Alkaloid.—Mr. Edward Grindle Hogg has made a series of experiments with a view to determining whether tincture of cinchona, when made in strict conformity with Br. Phar., contained all of the alkaloid present in the bark used (as maintained by Mr. Ekin in 1878), or whether, as asserted by Dr. Paul, the residue, after the official process of extraction, yielded a tincture equal in alkaloidal strength to that first obtained. His results confirm the statement of Dr. Paul. Tinctures were prepared from samples of calisaya bark, one quilled, two flat true calisayas, and one flat, not a true calisaya, but rich in alkaloid. The percentages of alkaloid in these barks were respectively 3.98, 4.25, 4.96, and 7.10 per cent.; the tinctures prepared from them contained alkaloids corresponding to 1.22, 2.87, 1.89,

and 2.15 per cent., and the several residual barks, after exhaustion according to the B. P., therefore retained 2.76, 1.2, 2.65 and 4.95 per cent. of alkaloid respectively. It might, perhaps, be suggested that the alcohol exhausts the bark of the quinine, but not so readily of the other alkaloids; but this is not borne out by the author's results, since in the case of two samples, in which the percentage of quinine was determined, this was considerably larger than the percentage of total alkaloid found in the tincture.—Phar. Jour. and Trans., Dec. 8, 1883, 444-445.

Mr. J. O. Braithwaite has made experiments in the same direction, having determined the total alkaloid, and the proportion of quinine, in eleven samples of *tinctura cinchonæ flavæ*, four of which were made by himself, the others were trade samples. These experiments confirm the results of Mr. Hogg. Thus from a bark yielding 5.224 per cent. of total alkaloid, the marc gave 2.665 per cent. and the tincture equivalent to 100 grams of bark 2.359 grams. Therefore, only about 45 per cent. of the alkaloid present in the bark goes into solution, whilst in poorer barks, giving a light colored tincture, this estimate is found too high, though four-tenths of the total alkaloid of the bark may reasonably be expected.—Ibid, 445.

Tincture of Nux Vomica—Difference in Alkaloidal Strength.—Messrs. Wyndham R. Dunstan and F. W. Short have contributed a paper on "tincture of nux vomica," at the meeting of the British Pharmaceutical Conference, in 1883. The authors state that, as might be expected, the difference in alkaloidal strength which in a former paper (see Proceedings 1883, 122-123), they showed to exist in the nux vomica seeds of commerce is perpetuated in the galenical preparation. They give the results obtained in the analysis of twelve specimens of tincture of nux vomica obtained from different sources, from which it appears that whilst the strongest tincture contained 0.360 per cent. of total alkaloid, of which one-third was strychnine and the remainder brucine, the weakest only contained 0.124 per cent., or just over one-third as much total alkaloid. The relative proportion between the two alkaloids was tolerably constant throughout the series of specimens, with the exception of one, in which they were present in equal quantity.—Yearbook of Pharmacy, 1883, 475-477.

Tincture of Nux Vomica—Notes on Preparation.—Messrs. Wyndham R. Dunstan and F. W. Short, in continuation of their experiments upon commercial tincture of nux vomica (see above and Proceedings 1883,) have endeavored to determine in how far the solvent may be responsible for the variation in strength. This involved a series of experiments in several directions, the character and results of which are briefly given in the following:

In order to determine by direct experiment the extractive power of

alcohol of different strengths the following experiments were made: Five gram quantities of nux vomica in impalpable powder were macerated for three days with 50 cubic centimeters of alcohol containing different proportions of water, the mixtures being frequently agitated. Maceration was adopted, because percolation with alcohol containing more water than proof spirit is rendered practically impossible owing to swelling of the seeds and consequent clogging of the percolator, occasioned by the action of the water upon the mucilaginous constituents; and it was deemed important that the experiments should be strictly comparative. After maceration forty cubic centimeters of the tincture were filtered off and the amount of total alkaloid determined by a process which has been described in general outline in their former paper upon tincture of nux vomica.

The following table shows the results of the experiments:

TABLE I.

Proportion of rectified spirit to water (by volume).	Quantity of total alkaloid in 40 cc. of tincture.	Percentage of total alkaloid extracted from the nux vomica.
100 : 0 (rectified spirit.)	0.078	1.95
100 : 25	0.088	2.20
100 : 33	0.088	2.20
100 : 50	0.089	2.22
100 : 60 (proof spirit.)	0.086	2.15
100 : 100	0.074	1.85

The marcs from these tinctures were found in all cases to be distinctly bitter, and hence in no case had the exhaustion been complete. The above results show that water mixed with rectified spirit in any proportion up to and including proof spirit, extracts more alkaloid than rectified spirit alone; but when the water rises above the proportion contained in proof spirit the extractive power for alkaloid again diminishes. The obvious conclusion to be drawn from these experiments is that proof spirit should be substituted for rectified spirit in the preparation of tincture of nux vomica. But there is one strong reason for suggesting the use of 100 volumes of rectified spirit mixed with 25 volumes of water. For although the extractive power of these two spirits may be said to be the same, the use of the stronger spirit has this advantage over proof spirit, that it percolates very much more freely, while, owing to the larger proportion of water in the proof spirit, the percolation occupies a much longer time and the percolator is very apt to clog.

The proposition of Mr. R. Rother (see Proceedings 1883) to use chloride of sodium as a means of securing the perfect exhaustion of nux vomica, was the next subject of the author's inquiry. The results, which

are given in Table II. and III. show that by the intervention of chloride of sodium to the amount of 1.5 per cent., the alkaloid is completely extracted, but that a menstruum composed of 100 volumes of spirit to 25 of water will answer the purpose nearly as well, if percolation is resorted to, and if the proportion of drug to percolate is 1:10. In the three experiments recorded in Table II., the finely powdered nux vomica was macerated for two days in the first, and for three days in the second and third experiments, the proportions being the same, viz., 5 grams of the nux vomica to 50 cc. of the menstruum. The two experiments in Table III. were by percolation of 5 grams of the fine powder with 50 cc. of the menstruum indicated in the Table.

TABLE II.

Proportion of rectified spirit to water. (By volume.)	Percentage of Na Cl dissolved in spirit.	Amount of total alkaloid in 40 cc. of tincture.	Percentage of alkaloid extracted from the nux vomica.
100 : 25	1.5	0.087	2.18
100 : 25	1.5	0.102	2.55
100 : 25	1.5	0.100	2.50

TABLE III.

Proportion of rectified spirit to water. (By volume.)	Percentage of Na Cl dissolved in spirit.	Amount of total alkaloid in 50 cc. of tincture.	Percentage of alkaloid extracted from nux vomica.
100 : 25	0.	0.125	2.5
100 : 25	0.15	0.130	2.6

The authors, finally, made some experiments with a view of determining the value of a process based upon the direct solution of the extract in a suitable menstruum, and incidentally mention the process of the U. S. Phar., 1880, which directs the adjustment of the tincture to definite percentage of dry extract. Apart from the fact that the alkaloidal strength of the dry extract is not constant (see extract of nux vomica under “Extracts,” p. 66), the authors, after experimenting with different menstruums, have not obtained results that would justify them in recommending such a process, though expressing the hope that they may elaborate a direct and simple method at an early date.—Phar. Jour. Trans., Dec. 1883, Amer. Jour. Phar., Jan. 1884, 31-36.

Tincture of Nux Vomica—Standard Preparation.—Similarly to their “Standard Extract of Nux Vomica,” (which see under “Extracts,” p. 65). Messrs. Wyndham R. Dunstan and F. W. Short now suggest the following process for preparing a “standard tincture of nux vomica”:

- Take of Nux vomica, in fine powder 1 pound.
- Rectified spirit. 64 fluidounces.
- Distilled water. 16 fluidounces.

Mix the spirit with the water and make the nux vomica into a paste with one pint of the mixture. Allow this to macerate for twelve hours, then transfer to a percolator and add another pint of the mixture. When this has percolated, pour on the remainder of the diluted spirit in successive portions; press the marc, filter the expressed liquid and add it to the percolate. Take of this liquid 1 fluidounce and estimate the amount of total alkaloid in the following way: Evaporate almost to dryness over a water-bath, dissolve the residue in 2 fluid drachms of chloroform and half a fluidounce of dilute sulphuric acid with an equal bulk of water; agitate and warm gently. When the liquids have separated draw off the chloroform and add to the acid liquid excess of solution of ammonia and half a fluidounce of chloroform; well agitate, gently warm, and after the liquids have completely separated transfer the chloroform to a weighed dish. Evaporate over a water-bath, and dry for one hour at 212° F. Allow the residue of total alkaloid to cool, and then weigh.

Take that quantity of the percolate which contains 20 grains of alkaloid and dilute to one pint (imperial) with a mixture of 4 parts by volume of rectified spirit with 1 part by volume of distilled water. This tincture will contain 0.24 per cent. by volume of total alkaloid; and 2 fluidounces of it, when estimated in the same manner as the percolate, should yield 2 grains of total alkaloid.

This “standard tincture” may also be prepared from the “standard extract” as follows:

Take of Standard extract of nux vomica.	133 grains.
Rectified spirit	16 fluidounces.
Distilled water	4 fluidounces.

Mix the spirit with the water and dissolve the extract in the mixture. One fluidounce of this tincture will contain one grain of total alkaloid.—Amer. Jour. Phar., April 1884, 203-206. Phar. Jour. and Trans., Feb. 9, 1884.

Laudanum—Commercial Quality.—Mr. H. B. Parsons has subjected forty-seven samples of laudanum purchased in different parts of the State of New York to analysis, with results shown in the following table:

LAUDANUM ASSAYS.

No.	Specific Gravity.	Temperature °C.	Wt. 1 fl. oz. Grains.	Solids 1 fl. oz. Grains.	Morphine 1 fl. oz. Grains.
1	0.9578	17	436.5	11.1	3.1
2	.9531	16	434.3	19.5	4.3
3	.9527	17	434.1	15.8	4.0
4	.9654	17	439.9	13.9	2.7
5	.9609	16	437.9	15.8	4.0
6	.9545	16	435.0	18.7	4.2
7	.9555	16	435.4	11.9	3.5
8	.9616	16	438.2	23.3	7.4
9	.9543	15	434.9	14.8	4.7
10	.9492	16	432.6	10.6	3.6
11	.9601	15	437.5	15.7	2.8
12	.9654	16	439.9	16.5	1.1
13	.9631	16	438.9	11.8	1.9
14	.9514	17	433.6	9.3	2.5
15	.9544	15	434.9	17.8	4.3
16	.9631	16	438.9	16.2	3.9
17	.9468	16	431.5	12.6	2.8
18	.9687	15	441.4	17.9	4.8
19	.9388	20	427.8	4.0	.9
20	.9529	16	434.2	10.3	2.3
21	.9577	16	436.4	14.4	3.3
22	.9562	17	435.7	14.9	3.5
23	.9582	17	436.7	16.2	3.3
24	.9540	18	434.7	16.7	2.8
25	.9488	16	432.4	9.1	1.6
26	.9569	16	436.1	10.1	2.1
27	.9477	18	431.9	12.7	3.2
28	.9447	17	430.5	13.1	2.7
29	.9627	16	438.7	18.6	3.9
30	.9526	16	434.1	11.8	3.3
31	.9518	16	433.7	11.9	2.6
32	.9509	16	433.3	7.2	1.9
33	.9557	15	435.5	16.5	4.3
34	.9512	17	433.5	15.7	3.9
35	.9567	16	436.0	15.8	3.2
36	.9583	16	436.7	13.1	3.2
37	.9596	15	439.3	10.4	3.5
38	.9568	17	436.0	13.3	4.1
39	.9521	17	433.9	12.0	3.1
40	.9666	17	440.5	14.0	3.7
41	.9580	17	436.6	13.9	3.9
42	.9496	16	432.7	7.6	2.0
43	.9557	17	435.5	10.7	1.7
44	.9588	16	436.9	15.2	3.4
45	.9654	16	439.9	18.4	4.4
46	.9566	16	435.9	13.5	2.4
47					
48	.9573	17	436.2	14.3	3.9

The samples having been purchased before the issue of the Phar. 1880, the standard of 1870 must be accepted. The author calculates that a strength of about 4 grains of morphia per fluidounce would be really about what was required by the late Pharmacopœia, but appends a table showing the number of grains of morphine in each fluidounce if made from different amounts or different grades of moist or powdered opium. This table, which is very interesting for comparison, is as follows:

PERCENTAGES IN MORPHINE. \wedge	MOIST OPIUMS.				POWDERED OPIUMS.					
	9	10	11	12	13	14	15	16	17	18
$1\frac{1}{4}$ tr. oz. to pint } $1\frac{1}{4}$ av. oz. to pint. }	3.3 3.1	3.7 3.4	4.1 3.8	4.5 4.1	4.9 4.4	5.2 4.8	5.6 5.1	6.0 5.5	6.4 5.8	6.8 6.2
1 tr. oz. to pint } 1 av. oz. to pint. }	2.6 2.5	3.0 2.7	3.3 3.0	3.6 3.3	3.9 3.5	4.2 3.8	4.5 4.1	4.8 4.4	5.1 4.6	5.4 3.1
$\frac{5}{8}$ tr. oz. to pint } $\frac{5}{8}$ av. oz. to pint. }	1.6 1.5	1.9 1.7	2.1 1.9	2.3 2.1	2.5 2.2	2.6 2.4	2.8 2.6	3.0 2.8	3.2 2.9	3.4 3.1

From an inspection of this table in connection with the assays of laudanum above presented, it appears :

- 1. That a considerable number (21) show an evident intention on the part of the maker to give a full-strength preparation. All results of 3.5 grains morphine and over are here included.
- 2. Some samples seem to have been made from one avoirdupois ounce of moist opium per fluidounce: the results ranging between 2.3 and 3.3 grains are here included, the number of samples being 17.
- 3. A number of samples seem to have been made of about one-half strength, probably from $\frac{5}{8}$ troy to $\frac{3}{4}$ avoirdupois ounce per pint. Results ranging between 1.3 and 2.2 grains are the basis of this supposition. About seven samples fall into this class.
- 4. Two samples fall even below this strength: they may have been on the half-strength plan but from very poor opium, or they may have been made from good moist opium in the proportion of one-half ounce avoirdupois per pint.

The analytical results presented are believed to be correct for morphine, within $\frac{1}{16}$ to $\frac{1}{8}$ grain, and the benefit of this correction has been given the manufacturers of the laudanum. Perfect extraction of all the morphine is not always accomplished even when the work is performed with care and conscientious attention to details, and it would be neither fair nor wise to condemn a man for a shortage of $\frac{1}{16}$ or $\frac{1}{8}$ grain of morphine per fluidounce.—New Rem., July 1883, 194-195, from Proc. N. Y. State Assoc., 1883.

Tincture of Opium—Examination of Commercial Samples.—Marie O. Glover has determined the strength of different samples of tincture of opium, which determinations are particularly interesting in view of the change in the strength of opium preparations made in the recent revision of the U. S. Pharmacopœia. The method of assay employed was that of Flückiger, as modified by Dr. Squibb (see Proceedings 1882, 229), but it was found necessary by the author to introduce some further modifications of this process, in order to obtain clean, light-colored morphine, for which reference must be had to the original paper. The results obtained were as follows :

No.	Per cent. of Morphia.	Grains of Morphia to the Fluidounce.
1	1.20	5.24
2	1.20	5.25
3	0.91	3.95
4	0.59	2.62
5	0.66	2.89
6	1.40	6.06
7	0.86	3.81
8	1.24	5.46
9	0.77	3.32
10	0.98	4.29
11	1.10	4.77
12	0.65	2.87
13	0.75	3.29
14	1.24	5.45
[15	1.31	5.70]
16	1.27	5.59
17	1.33	5.87

In summing up the results, the author observes that of the 16 samples of tincture of opium we have 7 answering nearly or quite the requirements of the U. S. P., 1880, 4 meeting those of the U. S. P., 1870, 2 somewhat below this standard, and 3 containing such a small percentage of morphia that they are open to the suspicion of having been intentionally made of low morphia strength.

In every case, however, where the label contained the letters U. S. P., or the statement that the laudanum was made according to the U. S. P., 1880, it was found to contain between 5 and 6 grains of morphia to the fluidounce.—Amer. Jour. Phar., Oct. 1883, 481-484.

Tinct. Opii Deodorata—Faulty Process.—Mr. George W. Sloan communicates some experiments made to determine the value of the process recommended by Mr. R. Rother (in Proceedings 1883, p. 79), in which the deodorization of the opium is effected by a melting mixture of vaseline and spermaceti. A tincture thus prepared from opium which had been determined to contain 13.8% of morphine, was found to be very deficient in that alkaloid. The tincture contained morphine corresponding only to 7.10% for the opium contained in it. Further experiments seem to be required.—Amer. Jour. Phar., Aug. 1883, 392-393.

Deodorized Tincture of Opium—Rother's Process.—Mr. Rother, referring to the adverse criticisms of his process for deodorizing aqueous solutions of opium with a fat (see Proceedings 1883), states that the fault lies in the insufficiency of time given to the extraction, and the peculiar form of the opium that the formula directs to be used. By using air-dried opium rubbed into a coarse powder, and by macerating or better digesting the opium at a gentle warmth for twenty-four hours first, the process leaves nothing to be desired. The fatty body directed in the

formula does not take up any of the morphine, and the author communicates experiments which tend to prove this. He, furthermore, gives the analytical method in his opinion best adapted to the assay of opium tincture, in detail, as well as the precise manipulation requisite for the extraction of the opium in the preparation of tinctures.—*Amer. Jour. Phar.*, Dec. 1883, 598–600.

Tincture of Aconite—Comparative Value of Different Preparations.—A writer in the “*Medical Times*” has determined the aconitia (as such, and evidently in an impure condition), in samples of the officinal tincture of aconite root, the tincture of the green plant, and the tincture of the green root, and obtained the following quantities of alkaloid from a pint of each of the tinctures:

From the green plant	1 $\frac{1}{2}$ grains.
From the green root	6 $\frac{1}{2}$ grains.
From the powdered root (officinal)	11 $\frac{1}{4}$ grains.

In order to calculate the strength of the tincture made from the green plant in comparison with the officinal tincture, allowance must be made for the moisture in the plant. The herb loses in drying seventy-five per cent. of moisture, so that, if all the juices were collected under the most favorable circumstances, it would represent one-third of its weight of dried drug; this diluted with an equal bulk of alcohol would reduce its strength to one-sixth its weight of powdered drug; and this is the real strength of the tincture, about two and one-half ounces to the pint. The tincture of the green root, according to a similar estimate, is about one and one-half ounces to the pint. So we have:

Tinct. aconite root, U. S. P.	6 oz. to 1 pint.
Tinct. aconite, green herb	2 $\frac{1}{2}$ oz. to 1 pint.
Tinct. aconite, green root	1 $\frac{1}{2}$ oz. to 1 pint.

This would be the exact comparative strength of the three preparations if the herb and root were equally rich in aconitia, but the analysis shows that one pint of tincture of aconite, U. S. P., yielded 11 $\frac{1}{2}$ grains of aconitia, while the tincture from the green root only yielded 6 $\frac{1}{2}$ grains, and from the herb was obtained 1 $\frac{1}{2}$ grains, so that the officinal tincture is nearly twice as strong as that made from the green root, and over seven times as strong as the green herb tincture. The result tends to prove that the active principles of the same plants can generally be more easily and more thoroughly dissolved by the right solvent from the green plant than from the dried plant; for if we obtain 6 $\frac{1}{2}$ grains from the equivalent of 1 $\frac{1}{2}$ ounces of the dried root from the green root and only 11 $\frac{1}{4}$ grains from 6 ounces of the root when dried, it shows over twice the yield in favor of the green root process; which shows that a good specimen of aconite root contains about nine-tenths per cent. of aconitia, and

that less than four-tenths per cent. are dissolved out by the U. S. P. process for making the tincture.

This also proves that it is practical, with small expense, to manufacture tincture of aconite root of a regularly uniform strength, and remedy the fault which is often found with its want of effect on the patient.*—New Rem., Sept. 1883, 266.

Tincture of Hyoscyamus—Variation According to Strength of Menstruum, etc.—Mr. William Gilmour having his attention drawn to a tincture of hyoscyamus of doubtful quality, has made a number of experiments to determine a method for distinction between tinctures of the annual and biennial plant. He has incidentally also made experiments in the direction of the most suitable menstruum for the extraction of the leaves and preservation of the dissolved matter. The conclusions arrived at are as follows:

First. That the spectroscope does *not* distinguish between a tincture made from an annual or a biennial plant.

Second. That the milky turbidity on the addition of water is not a test to distinguish the one from the other; but it is a fairly good test as to the quality, as far as age, exposure, etc., of the biennial plant is concerned.

Third. That a proof spirit tincture, although quickly changing so far as the chlorophyll matter is concerned, does not show this change to any extent to the naked eye, while the more important chemical changes which ultimately affect the quality of the tincture therapeutically are comparatively slow.

Fourth. That a rectified spirit tincture undergoes very rapid changes, which are very conspicuous to the naked eye, and which are almost certain to end in rapid chemical changes affecting the therapeutic value (if it possess any) of the tincture.

Fifth. That rectified spirit does not possess the same power of exhausting the henbane of its extractive matter as proof spirit.

Sixth. That a rectified spirit tincture and a proof spirit tincture are quite unlike in their appearance, so much so as practically to make them unrecognizable.—Amer. Jour. Phar., May 1884, 284–290, from Phar. Jour. Trans., March 29, 1884, p. 781.

Tinctura Digitalis—Examination of Precipitate.—Some tincture of digitalis, which had been kept in a glass-stoppered bottle for about two years, had lost by evaporation about one ounce, and deposited a compact precipitate. This was microscopically examined by Dr. H. Stieren, and consisted of chlorophyll, red-brown waxy extractive, and of

* The value of these experiments would be greater if the exact quantity of the green drugs used in the tincture, and the corresponding quantity of the dry drug, had been ascertained by the author.—Rep.

a yellowish, more or less crystalline substance, supposed to be digitalin. The precipitate was dissolved in one ounce of alcohol, sp. gr. 0.88, filtered, and mixed with the remaining 15 oz. of the tincture, the red-brown color of which being thus changed to the dark greenish-brown of the fresh tincture. Dr. Stieren directs particular attention to the partial separation of active principles, likely to occur with the deposition of precipitates in tinctures.—*Amer. Jour. Phar.*, Aug. 1883, 402, from *D. Am. Apoth. Ztg.*, May 1883, p. 122.

Extract of Vanilla—Preparation.—The editor of the “*Pharmaceutical Record*” says he has for many years made an extract of vanilla which has given perfect satisfaction to all who have ever tried the formula. The great complaint made by consumers is its inferior quality and strength; and, as furnished by nearly all manufacturers, and by a large proportion of druggists, there is just ground for the complaint. A prime quality of Mexican vanilla should always be selected, and no tonka beans should ever be used with it. The following has been the mode of procedure:

Vanilla beans, cut very fine. four ounces.
Cologne spirits,
Water equal parts.

Put the vanilla, finely cut, in a flask (or other suitable vessel that can be closed *nearly* tight) with two pints of the diluted spirits, and, by a water-bath, *heat the contents of the flask nearly to the boiling-point* for one hour. Pour off the fluid, add one pint of the dilute spirit, again heat for one hour, and repeat it a third time, pouring off as much as possible of the fluid. Turn the dregs of the vanilla into a glass funnel, which has a plug of cotton loosely put in the neck, and add slowly to it enough dilute spirits to obtain in all four pints. Mix all together, and filter. By this method, in five or six hours as fine an extract of vanilla can be made as by the more tedious process of percolation.

Tincture of Colombo—Proper Menstruum.—See *Fluid Extract of Colombo*, p. 74.

Tincture of Canella Alba—Menstruum.—See *Canella Alba*, under “*Materia Medica.*”

Tinctura Lappæ Fructus—Preparation.—Mr. Charles A. Heinitsh recommends the following formula for this tincture, recommended by Dr. W. C. Reiter as a remedy in psoriasis inveterata:

Ground burdock fruit. 16 troy ounces.
Alcohol 3 pints.
Water. 1 pint.

Mix the liquids and percolate in the usual way until 4 pints of tincture are obtained.

The dose used is a teaspoonful 3 or 4 times a day. The remedy seems to be effective ; after several months' use, the patient's hands and nails are assuming a normal condition.—Amer. Jour. Phar., March 1883, 569.

Tinctura Ferri Chloridi—Disadvantages of the Presence of Alcohol.—Mr. M. W. Coleman, in view of the discrepancy of opinion regarding the desirability of retaining the alcohol in the preparation, has made a series of experiments bearing upon this point, which lead him to the conclusion that the presence of alcohol, instead of adding stability to the preparation, in reality favors change. Thus, when the officinal tincture is exposed to sunlight, according to the duration of exposure, it changes in color to a greenish-brown or blackish-green. Under the same conditions the corresponding preparation made with water alone remains unchanged. This change, due to the reducing action of the alcohol, takes place even during free exposure to air. If it is considered desirable to have the preparation contain the small percentage of chloric ether, formed in the officinal preparation after standing some time, this might be added to an aqueous solution of the ferric chloride. The author also observes that when manipulating with the proportions and directions of the U. S. Pharmacopœia, the solution of ferric chloride never has the sp. gr. required (1.405), but generally the density of 1.390. Ten grams of this solution, when completely precipitated by ammonia, the precipitate washed, dried, and ignited, will weigh 1.882 grams instead of the quantity given by the Pharmacopœia (1.86 gm.). The sp. gr. of the tincture is found by the author to be .965 instead of .980. Commercial samples of the tincture showed considerable variation both from the officinal standard and that determined to be correct by the author.—Amer. Jour. Phar., Aug. 1883, 387-393.

Tinctura Iodoformi Composita.—Dr. G. Beck's formula, slightly modified, is as follows: Dissolve iodoform, 8 gm., balsam of Peru, 3 gm., in alcohol, 20 gm., and add potassium iodide, 70 gm., glycerin and water, each, 35 gm.—Amer. Jour. Phar., Dec. 1883, 630, from Med. Record.

Tincture of Iodine—Cause of Pungency.—Messrs. MacEwan and Gregory have attributed the pungency observed in tincture and liniment of iodine to the presence of allyl-alcohol in the methylated spirit employed (see Proceedings, 1883, 81). W. H. Darling directs attention to acetone, present in considerable quantity in crude wood spirit, as the probable cause of this pungency ; for the halogen substitution products of acetone are of an extremely irritating nature, much beyond the allyl compounds in this particular.—Phar. Jour. and Transactions, July 14, 1883.

The editor of "Amer. Jour. Phar." (Nov. 1883, 561) observes in this connection, that he has seen a sample of decolorized tincture of iodine made with sodium hyposulphite and ammonia (formula of Phar. Germ.

I.) which had a strong pungent odor resembling that of volatile oil of mustard ; made with a different alcohol, the pungency was not developed.

VINA.

Vinum Aloes—Extemporaneous Formula.—Mr. E. G. Eberle has had occasion to resort to the following extemporaneous formula :

Aqueous extract of aloes	½ oz. av.
Tincture of cardamom	fl. ʒ v.
Tincture of ginger	fl. ʒ ss.
White wine enough to make	Oss.

Dissolve the extract in the wine and add the tinctures.

The tinctures bring the alcoholic strength of the wine to that of the stronger white wine. This makes a clear solution, and is up to the required strength of U. S. P.—Amer. Jour. Phar., Feb. 1884, 119.

Wine of Tar.—Mr. Thos. S. Weigand suggests the following extemporaneous formula: Take of glycerite of tar (which see under “Glycerites,” p. 75), ʒiij, sherry wine, ʒiv, syrup, ʒij, water enough to make Oj.—Amer. Jour. Phar., Jan. 1884, 8.

Creasote Wine—Formula.—The following is recommended to diminish cough, fever, expectoration, etc., in phthisis :

Wood creasote	6 parts.
Compound tincture of gentian	30 parts.
Alcohol	230 parts.
Sherry wine	710 parts.

Mix. Dose : a tablespoonful two or three times daily in a cupful of water. New Rem., Sept. 1883, 278.

MISCELLANEOUS SUBJECTS.

Antiseptic Dressings.—Mr. B. Leroy Spiller gives an interesting description of the manufacture of antiseptic gauze, salicylated cotton, and similar dressings, for which see Amer. Drug., Feb. 1884, 21–22.

Antiseptic Gauze.—Maximum Safe Limit of Carbolic Acid.—Dr. Rupprecht draws attention to the fact that commercial Lister’s gauze often contains as much as 6 per cent. of carbolic acid. This he regards a dangerous quantity, and he desires to impress upon practitioners and manufacturers the following propositions :

1. A 3-per-cent. gauze (for children 1 per cent.) is amply strong enough to insure an aseptic condition of wounds.
2. A 6-per-cent. gauze, employed for larger dressings, may produce death by absorption through the skin ; this may easily occur in children.
3. Manufacturers of carbolic gauze would do well to state the percentage of carbolic acid contained therein upon the label.—New Rem., July 1883, 199, from Phar. Centralh., 1883, No. 12.

Naphthalin Cotton—Preparation.—According to “Rundschau,” naphthalin cotton may be prepared by saturating cotton, deprived of oily matter, with either one of the following solutions, according as a lower or higher percentage of naphthalin is wanted in the product:

- a.* Naphthalin 1 part.
 Ether 4 parts.
 Alcohol 12 parts.

Or,

- b.* Naphthalin 1 part.
 Ether 4 parts.
 Alcohol 4 parts.

New Rem., Sept. 1883, 278.

Medicated Gelatin—Use for Local Dressings.—Medicated gelatin is highly spoken of by Professor Peck (“Wien. Med. Zeit.”). The gelatin is dissolved in double its weight of distilled water, in a bath, and the desired medicine stirred in. This is cooled in any convenient shape. The patient is instructed to melt a piece of this in a saucer set in hot water, and apply with a brush to the diseased surface. After this is dry it should be occasionally painted with a thin coat of glycerin, which prevents its getting too dry and peeling off, and also makes it flexible, so that motion at the joints is not prevented. It is a most clean and convenient dressing, and should come rapidly into favor. It is easily removed in the warm bath.—Amer. Jour. Phar., Aug. 1883, 404, from Weekly Med. Rev.

Fumigating Tablets—New Formula.—Mr. Ad. Vomáčka directs to melt together 20 parts of benzoin, 20 of balsam of tolu, and 40 of balsam of Peru, at as low a heat as possible, and add to the melted mass 150 parts of “Brettfield spirit” (which see under “Spiritus,” p. 91). When the mixture is cool, add 4 parts of acetic acid, 2 parts of tincture of musk, and one part oil of rose, and mix the whole with enough magnesia or iufusorial earth to make a plastic mass free from adhesiveness. Roll this out, and cut it into round tablets, about 3 to 5 centimeters in diameter, which are to be wrapped in tin-foil. When laid upon a hot stove or other place having a proper temperature, these tablets diffuse their aroma very uniformly, and much more pleasantly than is usually the case when some other form of fumigation is used.—New Rem., Dec. 1883, 366, from Phar. Rundschau (Leitmeritz) No. 23.

Hungarian Cosmetic—Formula.—Mr. Ad. Vomáčka gives the following formula: Mix 100 p. of finely cut soap and 150 p. of finely powdered gum arabic with 200 p. of water to a uniform paste; melt 200 p. of yellow (or white) wax and 50 p. of spermaceti with 300 p. of water upon a water-bath, and when they are melted gradually add and incorporate the soap-paste, constantly stirring. Remove the heat, add 50 p. of glycerin,

and allow it to cool, constantly stirring. Then add 5 p. each of oil of bergamot and geranium, or perfume with any other that may be preferred. For *white* cosmetic, white wax must be used. For *brown* cosmetic, a sufficient quantity, according to the depth of color desired, of burnt umber or sienna is triturated with the glycerin to a fine paste, entirely free from grittiness. *Black* cosmetic is made by adding a proper amount of lampblack to the brown cosmetic, avoiding too much, however, which would make it sticky and smeary.—New Rem., Dec. 1883, 367, from "Seifenfabrikant."

Tooth Wash—New Formula.—A tincture is made from chips of cedar wood, such as is used for the finer qualities of lead pencils, by treating 1 part of it with 5 parts of brandy. In 250 gm. of this tincture dissolve oil of peppermint 2 gm., oil of anise 1 gm. A. Vomáčka states that this resembles Pierre's *Eau dentifrice*.—Amer. Jour. Phar., Nov. 1883, 563, from Rundschau, June 20, 1883.

Neuralgia Pencils—Composition.—So-called neuralgia pencils are now being offered in Germany and elsewhere. They are said to consist essentially of a mixture of menthol, thymol, and eucalyptol, fused and cast in small conical pellets which are fitted in a suitable handle. Others are made of menthol and ordinary camphor.—Am. Drug., May 1884, 95; Phar. Zeitg. and Med. Record.

Table-Mustard—Formula.—Mr. Dietrich gives the following formula: Take of taragon herb, dry, 50 parts, (or fresh, 150 parts); dill seed, 10 parts; caraway seed, 10 parts. Make an infusion with 2000 parts of water; strain, and pass enough water through the strainer to make 2500 parts. To the hot liquid add: black mustard, deprived of oil and powdered, 500 parts; white mustard, deprived of oil and powdered, 500 parts. When the mass is homogeneous add: common salt, 100 parts; sugar, 200 parts. Heat a short time longer, and finally add diluted acetic acid, 500 parts.—New Rem., Nov. 1883, 341.

Insecticide for Plants—Formula:

Soft soap	4 parts.
Tobacco.	6 "
Fusel oil	5 "
Methylic alcohol	20 "
Water	sufficient to make 1,000 "

Boil the tobacco with an equal weight of water for half an hour, replacing the water as it is dissipated on boiling. Then strain. Mix this liquid extract with the other ingredients, and add enough water to make 1000 parts.

Before use, the mixture is well shaken up, and then applied by means of a syringe throwing a fine spray to the affected plants.

A rather dilute infusion of tobacco alone is likewise very effective for this purpose.—New Rem., Aug. 1883, 246, from Chem. Jour.

Remedy for Fetid and Sweating Feet.—Dr. A. M. Vail ("Jour. Am. Med. Ass.," Nov. 3, 1883) says that he has never known the following to fail:

R. *Aluminii et ammon. sulph. exsic* grs. 2
Acidi boracici grs. 2
Aquæ rosæ grs. 35

M. Sig.—Apply with soft sponge without rubbing, just as soon as the shoes and stockings are removed, while the feet are yet moist. This is quite necessary, as also the care not to rub.

Let this be repeated every two or three days, in the evening.—Am. Jour. Phar., Feb. 1884, 122.

Indelible Ink—Preparation Without Silver.—The following formula is given in "Druggists Circular":

To a concentrated aqueous solution of chloride of copper add solution of caustic potash as long as a precipitate is produced. Allow to settle, decant or siphon off the supernatant liquid and dissolve the precipitate in the least possible quantity of water of ammonia. Finally add about 6 per cent. of dextrin. After the writing made with this ink is dry, it must be gone over with a hot iron before being washed.

Ink—Old Formula.—It is stated in "New Remedies" (Oct. 1883, 304), that the following formula is said to have been in use in 1654, and to have produced an ink of great permanency, if one may judge from manuscript written by the person who is the authority for the formula. One and one-half drachms of coarsely powdered galls, six drachms of sulphate of iron, ten drachms of gum-arabic, and one pint of soft water, are to be placed in a bottle, which is to be securely stoppered and placed in the light (sunlight if possible). Stir the contents occasionally until the gum and copperas are dissolved, after which the bottle should be shaken daily. In the course of four to six weeks the ink will be fit for use. The addition of ten drops of carbolic acid will prevent the formation of mould.

Hectograph—New Gelatin Mass.—The French Ministry of Public Works publishes a formula for a hectograph or gelatin pad which is said to produce very satisfactory results. The composition consists of 100 parts of good ordinary glue, 500 parts of glycerin, 25 parts of finely-powdered baric sulphate, or the same amount of kaolin, and 375 parts of water. For the copying ink a concentrated solution of Paris violet aniline is recommended. To remove the old copy from the pad, a little muriatic acid is added to the water; wash it gently with this liquid by means of a soft rag, afterwards using blotting paper for removing superfluous moisture.—Pharm. Handelsblatt, Pharm. Record, New Rem., July 1883, 200.

Scouring Paste—Formula.—Mr. J. W. Colcord observes that the fol-

lowing may not be the identical scouring paste so extensively being pushed, but it gives equal or better satisfaction in using:

Oxalic acid	1 part.
Peroxide of iron, jeweller's rouge	15 parts.
Powd. rotten-stone	20 "
Palm oil	60 "
Petrolatum	4 "

Pulverize oxalic acid and add rouge and rotten-stone, mixing thoroughly, and sift to remove all grit, then add gradually the palm oil and petroleum, incorporating thoroughly. Add oil of myrbane or lavender to mixture, apply with a piece of flannel, rubbing off with a piece of soft paper, and polish with a chamois. For cleaning metal the author has never seen its equal.—Pharm. Rec., May 1, 1884, 189.

Cleansing Compound for Plate Glass, Mirrors, etc.—One of the best materials for this purpose is a mixture of calcined magnesia, with enough purified benzin to produce, when shaken up, a thick milk. It should be kept in vessels provided with well-ground glass stoppers. For use, a small quantity of the mixture is applied to a muslin rag, or better, to a wad of cotton, and the windows, etc., rubbed with this. It may be very readily cleansed off without leaving any deposit in the corners.—New Rem., Oct. 1883, 293.

Label Varnish—Formula.—The following formula is recommended as producing one of the best varnishes for labels:

Sandarac (in coarse powder)	100 parts.
Mastic " "	40 "
Copaiba	15 "
Venice turpentine	30 "
Oil of turpentine	40 "
Alcohol	90 "
Absolute alcohol	90 "

Macerate until solution is effected.—New Rem., Oct. 1883, 301.

Black Varnish for Coating Bottles.—Mr. Ferd Simond recommends the following: Equal parts of asphalt and of boiled linseed-oil are heated for one hour, over a naked fire to about 200° C. (392° F.); then a sufficient quantity of lamp-black, previously triturated with oil of turpentine, is added, to make a mixture, which, when mixed with one-fourth or one-third its volume of oil of turpentine, will cover well. Usually, one coat is sufficient; in special cases, two coats may be required.

Sometimes it is desirable to be able to see the height at which the liquid in the bottle is standing. This may be accomplished, according to the author, by leaving a small round spot on opposite sides uncoated. The bottom of the bottle is likewise left unvarnished.—New Rem., Oct. 1883, 300; from Dingl. Pol. Jour.

Lacquer for Tin Ware.—C. Puscher communicates the following process, which is of particular interest to those that have occasion to put up goods in tin cans or boxes, and who would like to give them a pleasing exterior, besides completely protecting them against rust.

Thirty parts of crystallized acetate of copper are rubbed to a fine powder in a mortar, then spread out in a very thin layer upon porcelain, and kept for a few days in a moderately warm place, whereby the water of crystallization and a larger portion of the acetic acid will be dissipated. The residuary, bright-brown, light powder is then again rubbed up with addition of a little oil of turpentine, and finally mixed, under continued stirring, with 100 parts of fine copal varnish heated to 167° F. If the copper salt has been very finely levigated, it will be dissolved, on stirring, in perhaps fifteen minutes. The varnish is now poured into a glass and set aside, for a few days, in a warm place, being occasionally shaken up. Any small, undissolved residue of oxide of copper may be utilized at the next operation.

This dark-green varnish, when applied four or five times to tinned iron, imparts to it a fine green, lustrous color. But if heat be used, only two coats are necessary to produce various-colored tints, according to the temperature to which the articles are exposed. They may be heated either in an oven or on an equally heated iron-plate, and the tints produced are, successively, greenish, yellow, dark-yellow, orange or reddish-brown. The colors are brilliant and lustrous, and have the additional advantage of resisting the action of light. If the copal varnish was of good quality, the tins may even be hammered without losing their lacquer. Success depends greatly upon a uniform application of the varnish and of the subsequent heat.—New Rem., Aug. 1883, 247, from *Neueste Erfind. und Erfahr.*, 1883, 212.

Rapidly Drying Varnish—Preparation.—W. Dauner recommends the following: Mix intimately colophony with thick milk of lime; after 24 hours dry by heat and powder. This powder is used for preparing varnishes from soft resins as follows: Melt 100 parts of pine resin, add with constant stirring 10 to 15 parts of the above powder, continue to heat for 30 minutes, remove from the fire and add linseed oil 25 to 50 parts and oil of turpentine 35 to 90 parts, according to the thickness desired.—Hoffm. *Papierzeitung*. Am. Jour. Phar., May 1884, 294.

MATERIA MEDICA.

A. VEGETABLE DRUGS.

GENERAL SUBJECTS.

Medicinal Plants—Preservation in the Fresh State.—Dr. F. J. B. Quinlan, in view of the fact that fresh medicinal plants are believed to possess greater remedial value than the dried plants, draws attention to the following method of preserving them in a fresh state for a reasonable period: The herbs in a perfectly fresh state are bruised to a pulp in a mortar, placed into a glass bottle, and well tamped down; the stopper is then forced in so as to exclude every particle of air, and the top encased by beeswax softened by heat. The bottles are then buried in the ground at a depth of three feet. So treated, belladonna, conium, and other herbs have been kept for four months perfectly sweet and fit for pharmaceutical purposes; and it is probable that bottled herbs will keep in this manner for six or even eight months, and perhaps longer. Now and then a bottle will fail from imperfect manipulation.—Yearbook of Phar. Conf., 1883, 481-484.

Economic Plants of Brazil.—Dr. T. Peckolt has prepared a list of popular and scientific names of the economic plants of Brazil, which is reproduced in Pharm. Jour and Trans., Aug. 4, 1884, 85-88; from Zeitsch. d. Allg. Oester. Apoth. Vereins, xxi., 182, 197, 214.

Epiphytes—West Indian Species.—Mr. A. F. W. Schimper describes in great detail, in "Botanisches Centralblatt," the various epiphytes natives of the West Indies. They belong to a great variety of families. Of species, the largest number belong to the Orchidæ, but in the mass of individuals to the Bromeliaceæ and Aroidæ; next follow the Filices, Rubiaceæ, Gesneraceæ, Ericaceæ, Myrsinæ, Melastromaceæ, Bignoniaceæ, Clusiaceæ, Piperaceæ, Urticaceæ, and Cyclanthæ. They are usually herbaceous, but very often of considerable dimensions, less often woody. The subject is treated under three heads, viz: (1) General remarks on the epiphytic flora of the West Indies. (2) The structures of the different species. (3) The influence of their mode of life on their geographical distribution. As far as regards their mode of life, they may be classified into four groups, viz: (1) Those in which the adaptations are very simple, deriving their nourishment entirely from the detritus of the bark to which they are fixed. (2) Those that derive their nourishment through aerial roots which reach the ground. (3) Those in which the roots form a conspicuous spongy mass, in which great quantities of moisture and humus are collected. (4) Those in which the leaves perform the ordinary functions of roots in absorbing water and nutrient salts. The special contrivances in particular cases are described in detail.—Phar. Jour. and Trans., June 7, 1884, 992.

Food Products—Method Adapted to their Proximate Analysis.—Mr. E. Reichardt has modified the methods in general use and has thereby simplified the analysis of food products, and the like, very materially. The method requires three separate determinations :

1. *Ash.*—The substance is carbonized in an open crucible ; as soon as carbonization is completed, the heat is continued moderately, so that the crucible is only faintly red-hot on the bottom. The charcoal, even if rich in phosphates or silicates, is under these conditions burned very easily, while at the same time the vaporization of chlorides is completely prevented. During the preliminary combustion it is well to allow the flame to spread over the crucible, if preferred, sideways. The gases emitted are thus completely consumed, and the process may be conducted even in the close room without discomfort. The residue, freed from carbon, is the ash, which may, if desired, be further examined.

2. *Protein Substance.*—The most certain and accurate method consists in the determination of the nitrogen as ammonia, obtained by heating the substance to redness with soda-lime : 1 gram of the substance being ordinarily sufficient for this purpose. The nitrogen being determined, its quantity, multiplied by 6.25, is calculated on the amount of albumen or protein substance.

3. *Water, Fat, Sugar, Cellulose, and Starch—Digestible Carbohydrates.*—The substance is dried at 100°, the quantity taken being such as to leave from 1 to 2 grams of dry substance.

Fat.—The dry substance, properly comminuted by trituration, or otherwise, is treated with 10–20 times its weight of ether for 1–2 hours, then filtered, washed with a little ether, and the residue on the filter washed into the flask with 90% alcohol. If this is rapidly done, the whole of the substance is readily transferred to the flask, and the filter may be used in the following steps, otherwise it is necessary to spread the filter out on the hand and to rinse the rest of the material into the flask. The residue of the evaporation of the ethereal solution is calculated as fat, but must under particular conditions be specially examined.

Sugar.—The quantity of alcohol must be at least 10–20 times that of the substance, and, when the latter is rich in sugar, even more. After 2–3 hours the mixture is filtered, the residue washed with alcohol, and then immediately transferred to the flask with water in the same manner as above described. The residue of the evaporation of the alcoholic solution is calculated as sugar ; but under circumstances it may be necessary to subject it to special examination, since wax and similar bodies are taken up by the alcohol, and may, for example, be separated from the sugar by water.

Gum.—By treating the residue with 10–20 times the quantity of water for from $\frac{1}{2}$ to 1 hour in the cold, the gum is completely dissolved. The mixture is thrown upon a filter, capable of containing the entire quantity,

so that filtration may be rapid, the residue washed with water, and the mixed residue returned to the flask with water, using only as much of the latter as is absolutely necessary. The residue of evaporation is calculated as gum.

Cellulose.—The residual substance is now boiled with 25–30 c.c. of diluted sulphuric acid containing 5 per cent. H_2SO_4 , the flask being attached to a return-cooler, for one to two hours. This is best accomplished by attaching a long glass tube to the flask by means of a perforated cork, maintaining its inclined position by a suitable support, and regulating the boiling so that vapors shall not be emitted from this tube. By this treatment a uniform strength of the acid is maintained, and carbonization of the substance, addition of water, etc., are completely avoided. When the boiling is ended, the mixture is again filtered, the residue washed with a little water, and then treated in the same manner, with use of a return-cooler, etc., with a 5 per cent. solution of soda. The residue, after this treatment, is collected in a tared filter, washed completely with water, dried at 100°C , weighed, and calculated as cellulose.

Starch (Digestible Carbohydrates).—The liquids resulting from the boiling of the substance with sulphuric acid and soda are now united, acidulated strongly with sulphuric acid, and again boiled with a return-condenser for 1–2 hours. The liquid, when cool, is diluted to a specific volume, and measured portions of it, after having been rendered alkaline, are titrated with Fehling's solution. For five parts of sugar so found, 4.5 parts are calculated as starch.

The author, in illustration of his method, gives the following actual results:

	Beets.		Wheat.
	I.	II.	
Water	75.58	77.23	13.83
Fat	0.34	0.22	1.34
Sugar	13.50	13.70	0.20
Cellulose	1.46	1.24	1.36
Vegetable Carbohydrates	2.85	2.60	66.60
Protein substance	3.45	3.20	13.37
Ash	1.20	1.70	1.80
	<hr/> 98.38	<hr/> 99.89	<hr/> 98.50

—Arch. d. Pharm., June 1884, 415–419.

FUNGI.

Mushrooms—Preservation of Specimens.—A correspondent of the "Pharm. Ztg." recommends, for preserving specimens, to prepare a thin, longitudinal section which represents the whole structure of the fungus, to spread this out upon a plate of glass, and to paint its upper surface with mucilage, which penetrates the pores and displaces the

liquid. When dry, the section may be pasted upon glass by moistening the gummed side. Another correspondent of the same paper recommends to preserve the mushrooms in pure glycerin.—New Rem., Dec. 1883, 360.

Edible Mushrooms—Poisonous Principle.—G. Dupetit finds that all mushrooms contain a poisonous substance when uncooked.* The fresh sap of the *Boletus edulis* administered to rabbits, guinea pigs, and rats, by subcutaneous injection, caused their death. The sap of *Amanita cæsa*, *Amanita vaginata*, *Amanita rubescens*, *Agaricus campestris*, etc., has a similar action.

The sap of *Amanita rubescens* is poisonous to frogs, whilst that of the others is not. The poisonous action is due to something in solution, and not to extraneous microbes, as sterilization by means of a Pasteur's filter does not render the liquids innocuous. The active principle is insoluble in ether, chloroform, alcohol, etc., and is precipitated from the sap by the addition of alcohol, tannin, etc. It thus resembles the soluble ferments, and not the known alkaloids. A temperature of 100° renders all these mushrooms innocuous. The author has also obtained two alkaloids, apparently neurine and ptomaine.—New Rem., Sept. 1883, 260, from Comp. Rend., 95, 1367.

Ergot—Active Constituents.—Mr. J. Denzel has prepared the alkaloids ergotine and ecboline, which he finds, as prepared by him, to be permanent and well-defined substances. He has also prepared scleromucin and sclerotic acid in a pure condition, with a view to having the physiological action of all these products established. The products were administered in suitable cases by Drs. v Scanzoni, Sasinger, H. Fehling, and others, and it was found that neither the alkaloids by themselves, nor the sclerotic acid, possessed the full ecbolic action of ergot. Further experiments seem to point to a combination of ergotine, ecboline and sclerotic acid as possessing the full physiological action of ergot, but the author fails to give the preparation or manner of combination.

The author has also subjected the process for

Extract. Secal. Cornut., of the recently revised Pharm. Germ., to critical examination. This process differs essentially from that of the G. P. 1872, in that the extract obtained by evaporating the hydro-alcoholic solution filtered from the gummy precipitates is washed twice successively with alcohol: the object being to obtain as nearly as possible a pure sclerotic acid. Mr. Denzel has subjected this wash-alcohol to analysis, and finds that about one-half of the active alkaloids are thus removed, the alcohol containing $\frac{1}{4}$ of the total ecboline and $\frac{3}{4}$ of the total ergotine.

The ergotine and ecboline are identified with the alkaloids described by Wenzell, which are present in ergot to the amount of about 0.2 and 0.4 % respectively. The ergotin of Tanret the author regards to be a

* Very similar observations were made by Dr. Roufick, of Breslau (see Proceedings, 1883, 98).—REP.

mixture of the two. He is of the opinion, however, that Wenzell's alkaloids were not entirely pure, and that they contained some of his (Wenzell's) ergotic acid (sclerotic acid), which accounts for the difference in their reactions observed by Wenzell and the author respectively. The following table shows the reaction of the four important constituents of ergot.

Reagents.	Ecboleine.	Ergotine.	Sclerotic Acid.	Scleromucin.
Phosphomolybdic acid.	Whitish - yellow, soon becoming greenish.	Pale yellow.	Yellow, soon crystalline.	Light yellow flocculent.
Mercuric chloride.	Pure white voluminous.	Pure white dense crystalline in cubes.	Whitish, very voluminous with conc. reagent.	Whitish flocculent with conc. reagent.
Auric chloride.	Chocolate color.	Yellowish brown		
Tannin.	Voluminous whitish.	Whitish, voluminous only in conc. solution.	Whitish, very voluminous.	Whitish.
Platinic chloride.	Dark orange colored.			
Mercurio-potassic iodide.	Dirty yellowish white.	Lemon - yellow crystallized.		
Concentrated sulphuric acid.	Colorless solution.	Colorless solution.	Brown-red solution.	Brown-red solution.
Conc. sulphuric acid and potassic chromate.	Colorless solution, turning green.	Colorless solution, turning green.		
Bismutho-potassic iodide.	Brick-red.	Blood-red.	Orange colored.	Orange, flocculent.

Finally, the author observes that by treatment of ergot with ether considerable quantities of ecboleine are extracted, and that the officinal (Ger. Phar.) powder is consequently considerably weakened by this treatment. Bisulphide of carbon likewise abstracts ecboleine.—Arch. d. Phar., Jan. 1884, 49-63.

In a subsequent paper Mr. Denzel states that experiments, made in conjunction with Dr. C. Wacker, have shown that petroleum ether, or benzin, is the most suitable substance for extracting the fixed oil from ergot, since it does not extract any portion of the alkaloidal constituents.—Ibid., April 1884, 314.

Ergot—Nature of its Poison.—According to the recent researches of A. W. Poehl, it seems that the poisonous action of the ergot, the bad effects of which are so often witnessed in Russia, is due to putrefaction-poisons, true ptomaines, which appear during the decomposition of the

albuminoids in flour. The ergot, that is the sclerotium of the small mushroom, *Claviceps purpurea*, has energetic peptic qualities, and thus would directly contribute to the formation of ptomaines in the flour.—Am. Jour. Phar., Sept. 1883, from "Nature."

Ergot—Chemical Character of Violet Coloring Matter.—Mr. R. Palm reports that the coloring matter in ergot is not, as commonly supposed, combined with alkaline earths, and describes its behaviour with solvents and reagents. For its detection in meal, the sample previously dried, is extracted at 30° to 40° C. with ten to fifteen parts of alcohol of 35 to 40 % (Tralles), with the addition of a few drops of ammonia. The mass is then carefully expressed, the liquid completely precipitated with basic acetate of lead, the precipitate collected on a filter, pressed between folds of bibulous paper, and the residue, whilst still moist, digested with a saturated solution of borax at a very gentle heat. The solution, if ergot was present, takes a characteristic violet color. For the detection of ergot in bread a modification of the above method is given.—New Rem., Dec. 1883, 465, from Zeitsch. f. Anal. Chem.

Ergot—Decomposing Action upon Albumins.—Mr. A. Poehl has made comprehensive researches on the different conditions of the putrefaction alkaloids in blighted rye meal, as: (1) the conversion of the starch into glucose; (2) fermentation of the glucose with formation of the lactic acid; (3) peptonization of the albumins by the peptic action of the mycelium of *Claviceps purpurea*; (4) conversion of the peptone into ptomopeptone, and its decomposition with formation of putrefaction alkaloids.

From the result of his researches it follows: (1) that ergot and mould have a peptonizing action on the albumins and favor their decomposition; (2) the degree of putrefaction of the albumins is directly proportional to their peptonization; (3) in the first stages of putrefaction, the decomposition of the albumins is greater in ergot meal than in mouldy or pure meal, but in the more advanced stages these differences are not so marked. Further researches on the decomposition of albumins by the *Claviceps purpurea*, and the part played by various genera of fungi are promised.—Amer. Jour. Phar., Mar. 1884, 158–160; Jour. Chem. Soc., Dec. 1883; Berichte, xvi, p. 1975.

Ergot.—Removal of the fat from the *powder*, which see under "Pharmacy," p. 87; see also p. 122.

Ergot—Value in Delirium Tremens.—Dr. Arnoldow ("Deutsche Medicinal-Zeitung") relates the case of a man suffering from hæmoptysis, who was also threatened with delirium tremens. Chloral had been given for the sleeplessness, but without effect. Upon the administration of ergotin, not only did the hemorrhage cease, but the symptoms of alcoholism also subsided. This happy result induced the author to give ergot in several other cases of mania-a-potu, in all of which the delirium was

speedily controlled. Dr. Arnoldow explains this action by the contraction of the blood-vessels of the brain induced by ergot.—Amer. Jour. Phar., Aug. 1884, 397, from Amer. Med. Digest.

Aspergillus Glaucus.—Occurrence in *sulphate of quinine*, which see under “Organic Chemistry.”

GRAMINAGEÆ.

Pop-Corn—A New Remedy for Vomiting of Pregnancy.—Pop-Corn has been introduced to the materia medica by Dr. F. C. Wallace (“Medical and Surgical Reporter”) as a Remedy for the vomiting of pregnancy. It is to be prepared in the usual way in a wire popper and sprinkled lightly with salt, and is to be eaten freely. He speaks from an experience of several cases in which it served a good purpose, and reports one in which accepted remedies had previously failed. Dr. E. J. Kempf, in the “Louisville Medical News,” speaking favorably of personal experience with it, says that Dr. F. A. Burrall called attention to it three years ago.—Amer. Jour. Phar., Sept. 1883, 473.

Rice—Presence of Large Quantities of Oily Substance in the Embryo.—According to G. Campasi, the embryo of the rice contains large quantities of oily substance, which he finds to be composed of 95.54 per cent. of fatty acids, and 4.46 per cent. of glycerin. Treatment with bisulphide of carbon produces a yellow wax-like substance which readily saponifies with bases, melts at 32° C., becoming quite solid again at 28° C., and having the sp. gr. 0.93005. It is completely soluble in ether, chloroform, and benzin. The fatty acids melt at 36° C., emit a perceptible pear-like odor, and yield when saponified and heated with acetate of magnesia, a body which melts at 62° C., and exhibits the composition of palmitic acid. Pharm. Jour. and Trans., July 14, 1883, 32.

Sorghum—Manufacture of Sugar in the United States.—See *Carbohydrates* under Organic Chemistry.

Malt and Malting.—Mr. F. X. Moerk has contributed a paper on malt and malting, which gives details and information not ordinarily accessible, and will therefore be referred to with advantage by persons interested in the subject.—See Amer. Jour. Phar., June 1884, 305–308.

Malt—Microscopical Examination.—Miss Grace Lee Babb has made some interesting microscopic studies of barley malt, during the different stages of its development.

The barely grain is elliptical in shape; its principal part is the farinaceous matter, as the embryo occupies but a small indenture at one end and on the outside. On the opposite side from the embryo, running lengthwise, is a gradually broadening groove. Closely adhering to the endosperm is the pericarp, and outside of this is the so-called husk. Both the pericarp and the husk are smooth and continuous over the embryo, and terminate in the groove.

A transverse section through the barley grain shows the thin-walled parenchyma radiating from the groove, and on the outer edge two or three rows of gluten cells: beyond these are the tabulated cells of the husk, in which is deposited a large amount of silica: between these is seen a brown line of indefinite structure, which forms the pericarp. The gluten cells extend around the grain, but as the pericarp descends into the groove they are obliterated.

With the hope of determining when there was the greatest change in number and appearance of the starch granules, transverse sections of the barley grain were made, and also of the barley in its different stages of malting, from the steeped down through the series, even including that which had been exposed ten days. The following results have been obtained: The starch granules of the barley vary in size and shape; some of them are very minute and globular, while others are much larger and have much the same elliptical shape as the barley grain itself. A line which resembles the groove in the barley grain extends the entire length of the starch granule.

The greatest change seems to take place in the minute globular starch granules, as on the tenth day these have to a great extent disappeared, and in some specimens are entirely wanting. On the tenth day there are still found some of the larger elliptical starch granules, and, although their number has decreased, the relative size of the residue has apparently increased. The radiating structure which has already been mentioned as being characteristic of the barley grain is not as distinct in the steeped grain, and can with difficulty be traced in the first day's malt. In these two the starch granules do not appear to be materially changed. In the third day malt the whole structure of the barley grain seems to be expanded; the smaller starch granules become more scattered, and an increase in the size of the elliptical starch granules is noticed. This latter change gradually increases in the fourth, fifth and sixth days' malt, being greatest along the groove, and thence radiating out towards the margin. In the seventh day malt there seems to be the greatest change; the elliptical granules are still observed to be larger, but are now very few in number. The appearance of the eighth and ninth days' malt is not essentially different from that of the seventh day's malt. In the tenth day malt the majority of the grains show a very few elliptical shaped starch granules, and the smaller granules are now replaced by globular masses, the nature of which has not been determined.

In conclusion, the results of the labor spent in this direction indicate that, with sufficient practical experience, the difference between malt which has been subjected to different degrees of exposure upon the floor could be readily detected. It is to be hoped that the subject of the microscopical determination of the value of malt may hereafter be carried out with valuable developments.—*Amer. Jour. Phar.*, June 1884, 308-310.

PALMACEÆ.

Sabal Serrulata, Roemer et Schultes—*Description of the Fruit, etc.*—Mr. J. Moeller describes the dried fruit of the

Saw-Palmetto, as being oblong ovate, 10 to 15 mm. ($\frac{3}{8}$ to $\frac{1}{2}$ inch) long, 5 to 9 mm. ($\frac{1}{4}$ to $\frac{1}{2}$ inch) broad, bluntly pointed at the base, externally blackish-brown, netted-wrinkled, weighing about .5 gm., inodorous and tasteless, and containing a shriveled seed. The pericarp is 1 mm. thick, and consists of three well-defined layers of nearly equal thickness; the blackish-brown resinous epicarp, the yellowish-green mesocarp, and the

FIG. 26B.

FIG. 26 A.



1. Fruit of saw palmetto, natural size. 2. Transverse section; through *e* epicarp; *m*, mesocarp; *c*, endocarp; *x*, fibrovascular bundle; magn., 125 diam. 3. Section through horny endosperm; magn., 125 diam.

yellowish brittle endocarp, composed of sclerenchyma. Soaked in water, the mesocarp swells considerably, and somewhat less the epicarp. Both tissues are formed of thin walled cells; those of the latter are filled with a brown mass; those of the former colorless or brownish, and surrounding numerous fibrovascular bundles. The thin walled cells of the testa contain a red brown mass. The endosperm is hard and hornlike, swells rapidly in water, and consists of a peculiar parenchyma, which becomes gelatinous by potassa.

Iron salts color the contents of the cells of the epicarp blue, but scarcely affect those of the testa. The contents of the latter are soluble in alkalis; those of both tissues insoluble in water. The mesocarp contains sparingly groups of calcium oxalate crystals, also remnants of protoplasm, which are also found in the endosperm. Starch is not present.—*Amer. Jour. Phar.*, Sept. 1883, 466, from *Phar. Centralh.*, 1883, No. 15.

Dragon's Blood—*Characters of Distinction of the Different Varieties.*—Besides the red resins from *Pterocarpus Draco* and *Croton Draco*, there are three different recognized kinds of dragon's blood, one from the

East Indies, *Calamus Draco*; one from Socotra, and one from the Canary Islands, *Dracæna Draco*. The first of these is the only one that has been fully described, but the results are not concordant; this is due apparently to the researches having been carried out on different substances. Messrs. J. J. Doblic and G. G. Henderson have now investigated this subject, and have examined several varieties of the so-called dragon's blood, which they find can be arranged in four distinct groups: 1. Those which dissolve completely in chloroform, carbon bisulphide, and benzene; 2. Those soluble in chloroform, but insoluble in carbon bisulphide and benzene; 3. Those soluble in chloroform and benzene, and partly in carbon bisulphide; and 4. Those which are insoluble in all three reagents. The accuracy of this classification is supported by the physical properties of the resins and their behavior towards reagents, and it is evident, therefore, that there were four different kinds of resins under examination. All the resins dissolve to a small extent in boiling water, those of Class 4 being rather more soluble than the others; they are all freely soluble in alcohol, ether, oil of cloves, and glacial acetic acid, leaving a variable amount of insoluble matter, which usually consists of vegetable tissue, sand, etc. They are all slightly soluble also in hydrochloric acid, those of Class 2 being the most soluble; ammonia reprecipitates them from this solution. The aqueous and alcoholic solutions have an acid reaction. When treated with sodium hydroxide, the resins effervesce and emit an odor like that of rhubarb. Ammonia forms a clear mixture with the alcoholic solutions. The resins were carefully purified by means of ether, and then powdered; the results of the individual class examinations may be thus summed up: Resin 1, brick-red, melting at about 80° , when decomposed by heat gives off very irritating red fumes. It dissolves readily with an orange-red color in alcohol, ether, chloroform, carbon bisulphide, and benzene, but with difficulty in boiling caustic soda, ammonia, sodium carbonate, and with great difficulty in lime-water, whilst in the cold it is scarcely soluble in the first two, and insoluble in the last two of the latter reagents. The ammonia solution is reddish-yellow, and a portion of the resin is not dissolved. The alcohol solution gives a brown-red precipitate with lead acetate. Analysis (combustion and lead estimation) suggests the formula $C_{18}H_{18}O_4$. This variety is derived from *Calamus Draco*. Resin 2, $C_{17}H_{18}O_6$, origin uncertain, is carmine-red, melting at about 100° ; when heated it gives off non-irritating fumes. It dissolves freely in alcohol, ether, and chloroform with a pink color, and in cold caustic soda, ammonia, sodium carbonate, and lime-water with purple color changing to orange-red or yellow on boiling, whilst it is insoluble in carbon bisulphide and benzene. The alcoholic solution gives a lilac-colored precipitate with lead acetate. Resin 3, $C_{18}H_{18}O_4$, from *Dracæna*, is vermilion, melting at about 80° ; when heated it evolves aromatic irritating red fumes. It dissolves with a

blood-red color in alcohol and ether, and in cold caustic soda, ammonia, lime-water, and sodium carbonate, but is insoluble in chloroform, carbon bisulphide, and benzene. Its alcoholic solution gives a mauve-colored precipitate with lead acetate. Resin 4, is a mixture of a reddish-brown resin, freely soluble in carbon bisulphide, and a light brick-red resin, nearly insoluble in that menstruum. The two portions differ considerably with regard to their solubility in ether, benzene, and other reagents, the dark portion being the less soluble of the two. Cinnamic acid was detected in the first and third varieties, but not in the others. Johnstone found two resins in one kind of dragon's blood; to the one he gave the formula, $C_{20}H_{24}O_4$, and the other, $C_{20}H_{22}O_4$.—Amer. Jour. Phar., June 1884, 327-328; Phar. Jour. and Trans. [3], 14, 361-364; Jour. Chem. Soc., April 1884, p. 462.

LILIACEÆ.

Convallaria Majalis—*Value as a Substitute for Digitalis*.—Dr. W. S. Gottheil, House Physician of Charity Hospital, New York, contributes to the "Therapeutic Gazette" for January, 1884, a detailed account of his use of *convallaria majalis* in fifteen cases, comprising organic heart disease, cardiac failure in acute rheumatism, hemorrhages of phthisis, and one case of Bright's disease. The results would seem to justify a thorough trial at the hands of the profession of this proposed substitute for digitalis. It possesses the very important negative property of producing no cumulative effect, a desideratum which has been long felt by the profession.—Amer. Jour. Phar., Feb. 1884, 122.

Convallaria Majalis—*Unpleasant Effects*.—This drug is not as perfectly safe as some have believed. Dr. George Herschell relates in the *Lancet* the case of a man, apparently healthy, who had an irregular pulse following worry and overwork two years ago. The patient had been taking digitalis, but this was discontinued, and, after an interval of a month or two, tincture of *convallaria* was ordered in five-minim doses three times a day. After a few doses he was obliged to stop its use on account of its remarkable effects. Almost immediately after taking a dose the pulse became nearly imperceptible at the wrist, and there was a sense of oppression over the sternum, nausea, cold feet, vertigo, flatulence, and a feeling of utter prostration. These symptoms lasted two hours, but came on again at each repetition of the dose.—Weekly Med. Review, Dec. 1, 1883; Amer. Jour. Phar., May 1884, 294.

Barbadoes Aloes—*Cultivation in St. Helena*.—Mr. Morris, in a recent report on the Island of St. Helena, states that the Barbadoes aloe (*Aloe vulgaris*) is abundant in the island, and capable of being largely utilized. It grows freely in Jamestown Valley, in volcanic ash, and on barren rocks. It is fast spreading also in Rupert's Valley; and he noticed that it was there used, and seemed to flourish, as a coping for a stone wall.

The author is of the opinion that if attention were given to its cultivation, and some tradesman would undertake to purchase the manufactured aloes from the cultivators in small quantities, the industry would soon be placed upon a satisfactory footing.—Phar. Jour. Med. Trans., June 14, 1884, 1012.

IRIDACEÆ.

Saffron—Presence of Alumina.—Mr. Ernst Schmidt has had occasion to examine two samples of saffron, which, whilst normal in appearance, and not yielding an excessive quantity of ash, or containing an excess of moisture, were remarkable in that they contain small percentages of alumina—the one 0.115%, the other 0.123%.—Arch. d. Pharm., Sept. 1883, 676-678.

Mr. J. Biel has since examined a specimen which was undoubtedly genuine, and found it to contain 0.283 per cent. of alumina.—Arch. d. Pharm., Jan. 1884, 29.

Saffron—Sophistication.—Mr. J. Hart, having his attention drawn to an abundant yellow powder at the bottom of a shop bottle containing saffron (*Crocus sativus*), made a thorough examination of the sample, and found it to be adulterated to the amount of 25 to 30 per cent., or more, with a mixture the constituents of which were as follows:

BaSO ₄	64.28
CaSO ₄	14.57
Al ₂ O ₃ , with trace of Fe.	10.71
Salts of K and Na.	9.28
	<hr/>
	98.84

A sample of saffron of known purity yielded on incineration a residue amounting to 5.12%, while the adulterated article, when freed as much as possible from powder by shaking and rubbing, yielded 20% of ash.—Amer. Jour. Phar., June 1884, 328-329, from Phar. Jour. and Trans., March 15, 1884, 738.

AMOMEACEÆ.

Amomum Melegueta, Roscoe—Proximate Analysis of the Seeds.—Mr. John C. Thresh has subjected these seeds—the so-called “grains of paradise” to proximate analysis, and tabulates his results as follows:

Soluble in Petroleum Ether.	{ Volatile oil . . . . .	.63
	{ Active principle	3.39
	{ Resin. . . . .	.50
	{ (?) Acid . . . . .	.80
Soluble in Alcohol. . . .	{ Tannin. . . . .	.99
	{ Phlobaphene . . . . .	.50
	{ Resins . . . . .	.63

Soluble in cold water . . .	{	Mucilage. . . . .	.22
		Organic acids, etc., precipitated by lead acetate. . .	.38
		Albuminoid.	1.30
Taken up by successive treatment with dilute alkali, boiling water, and dilute acids.	{	Metarabin . . . . .	.79
		Starch	27.30
		Pararabin	3.12
		Albuminoids not soluble in water.	4.10
		Other substances taken up by acids	6.59
Lignin, etc			23.70
Cellulose.			5.65
Ash			3.36
Moisture			16.05

Grains of paradise appear to have been previously analyzed by Willert, who found volatile oil, acrid resin, extractive, tragacanthin, and woody fibre. Later Sandroek found two resins, one precipitable by neutral acetate of lead, and the other not. The *volatile oil*, however, is the only constituent which can be said to have been examined. Flückiger has studied, and described it in "Pharmacographia," and Mr. Thresh's results simply confirm those of Flückiger. Regarding the *active principle* the author refrains from giving it a name until his examination of it is more advanced. It is a straw colored, viscid, odorless fluid, pungent in taste (not nearly so hot as capsaicin, but probably hotter than the pungent principle of ginger). It is slightly soluble in petroleum ether and petroleum, very soluble even in dilute alcohol, also in benzol, chloroform, ether, disulphide of carbon, glacial acetic acid and solution of potash. From the latter solution it is precipitated by carbonic acid and by chloride of ammonium.—Phar. Jour. and Trans., April 5, 1884, 797–801.

ORCHIDACEÆ.

Vanilla—Cultivation in Mexico.—The following interesting account is given in "Oil, Paint, and Drug Rep.":

In Mexico, vanilla is planted either in a forest or in a field. In the former case, the underbrush, climbers, and large trees are cut down and removed, and the young saplings only preserved to serve as supports to the vanilla plant, preference being given to trees having a milky sap. Near each tree two cuttings of the vanilla plant are placed, side by side, in a shallow trench, and covered with dead leaves, brush, etc. The rest of the cuttings, to the extent of three or four feet, are placed against the tree, and tied to it. The supporting trees should not be nearer than twelve or fifteen feet apart, to give sufficient room for the development of the plant. After a month, the cuttings will have taken root, and must be carefully kept from weeds and briars of all kinds. In the third year, the plant begins to bear fruit, which it continues to yield for many

years. When the vanilla is cultivated in a field, the Mexicans first plough the ground thoroughly, and raise on it a crop of corn. In the protection afforded by this plant, a number of young milk-bearing trees of the fig family grow, which in about twelve or eighteen months are large enough to answer as supporters to the vanilla plants, which are then placed as above described. In Mexico and Guiana, the plant is allowed to climb up the trees, the fertilization of the flowers is left to nature, and a large number of flowers constantly remain unfertilized, and the yield of vanilla is small. In a few days after fecundation, the flowers fall off, and the fruit continues to grow till the end of the first month; it takes, however, another five months before it is completely ripe. Each pod must be gathered separately, and not the whole cluster at once, the time to gather them being indicated by the pods cracking when pressed with the fingers. If too ripe, the pods split on drying, changing the color from yellow to brown and black. If not ripe enough, the fruit will lack fragrance and proper color. The ripe fruit has no odor at first, the agreeable odor of vanilla being developed by a process of curing. When the first fruit is drying, an unctuous, dark-red liquid, called balsam of vanilla, exudes. In Mexico, the pods are collected and placed in heaps in a shed protected from the rain and sunshine, and there left for a few days; they are then, if the weather is warm and clear, spread in the morning on a woollen blanket, and exposed to the direct rays of the sun; at about midday the blanket is folded around the beans, and the bundle is left in the sun for the remainder of the day. In the evening, it is enclosed in tight boxes to "sweat" all the night. The next day, the same treatment is adopted, and the beans, after exposure to the sun, acquire a dark coffee color, the shade being deeper in proportion to the success of the "sweating" operation. If the weather is cloudy, the vanilla is collected into bundles, a number of which are packed together in a small bale, which is first wrapped with woollen cloth, then with banana leaves, and finally with a stout matting, which is firmly bound and sprinkled with water. An oven is then heated to 60° C., and the bales containing the larger beans are placed in it. When the temperature has fallen to 45° C., the smaller beans are introduced, and the oven closed tightly. Twenty-four hours afterwards, the smaller beans are taken out, and twelve hours later the larger ones. The vanilla has then acquired a fine maroon color. The drying operation then commences. The beans are spread on matting, and exposed to the sun every day for two months. When the drying is nearly completed, it is finished in the shade in a dry place, and the pods are then tied up in small bundles for sale.—New Rem., Sept. 1883, 276.

Vanilla—*A New Species from Guadaloupe*.—Attention is directed by Mr. Charbonnier, in the "Répertoire de Pharmacie" to a new species of vanilla that has recently appeared on the French market. It appears to

be as yet little known, and a description of it is not to be found in any work on materia medica. According to accounts, it has been cultivated in Guadeloupe during the past seven or eight years, and is probably furnished by a variety of *Vanilla planifolia*. It at first sight resembles the Bombay or Java vanilla, but, though blackish, the color of the pods is not quite so dark as the latter sorts. It is dryer looking, and not so covered with crystals of vanillin. But the special characteristics are a peculiar odor and the fact that the pods are somewhat flattened instead of being of the usual irregular triangular form. The last-named characteristic is probably due to a difference in the method of preparation. Further, the surface of the pods is finely striated longitudinally, and there are but few depressions. Generally, this vanilla has a good appearance, but its perfume is coarser and less permanent than the Bourbon sorts. It is of inferior quality, but at the same time its price is only about half that of Bourbon vanilla.—New Rem., July 1883, 200.

Vanilla—Poisonous Character.—Mr. Jaillet reports that there is some vanilla in the market which has grown upon Réunion along the trunks of *Jatropha Curcas*, and has become contaminated with the poisonous milky juice of this tree. The author ascribes to this fact the noxious effects which have lately been observed to follow the eating of vanilla ices in some localities.—Amer. Drug., April 1884, 62, from Rundschau, 1884, No. 35.

Vanilla—Poisonous Effect.—Drs. Layet and Arnozan have communicated to the French Association for the Advancement of Science the results of their researches on the physical qualities, the effects, and the parasites of vanilla. They cited several cases of poisoning by eating of vanilla ice-cream. It was at first supposed to be due to the formation of lactate of tin in the vessels, but cases of poisoning followed the use of the same stock of vanilla in the hands of a confectioner in another city, who had purchased it. There were other cases in Berlin.

The symptoms simulated cholera—continued vomiting, diarrhœa, epigastric pain, cramps in legs, face and extremities cold and purple. The symptoms ensued in about two hours after eating, and recovery in three or four hours.

Among operatives, those who cut the vanilla into small pieces are troubled with papular eruptions of the face and hands, with local heat and swelling, irritation of the eye and lids, and oftentimes patches of redness and desquamation.—Amer. Drug., March 1884, 52, from Boston Medical and Surgical Journal.

LAURACEÆ.

Camphor—Manufacture in Japan.—The following interesting account of the manufacture of camphor in Japan is given in the report of Mr. Jones, counsel at Nagasaki. After giving a description of the tree, its dis-

tribution, etc., the author states that in the manufacture of camphor the tree is necessarily destroyed; but, by a stringent law of the land, another is planted in its stead. The tree being felled, it is cut into chips. A large metal pot is partially filled with water and placed over a slow fire. A wooden tub, having a perforated bottom, is fitted to the top of the pot, and the chips of camphor wood are placed in this. A steam-tight cover is fitted on the tub. From this tub a bamboo pipe leads to a second tub, through which the steam, the generated camphor, and the oil flow. This second tub is connected in like manner with a third, which is divided into two compartments, one above the other, the dividing floor being perforated with small holes, to allow the water and oil to pass to the lower compartment. The upper compartment is supplied with a layer of straw, which catches and holds the crystals of camphor. The camphor is separated from the straw, packed in wooden tubs of $133\frac{1}{3}$ lbs. each, and is ready for market. After each boiling the water is run off through a faucet, leaving the oil, which is used by the natives for illuminating and other purposes.—St. Louis Druggist, Aug. 18, 1883.

CHENOPODIACEÆ.

Sugar-Beet—Formation of a New Chromogen in the Juice.—See *Coloring Matters* under “Organic Chemistry.”

GLOBULARIACEÆ.

Globularia Alypum—Constituents of the Leaves.—Heckel and Schlagdenhauffen obtained from the leaves by extracting with carbon bisulphide 2.85 per cent. of extract, consisting chiefly of fat and chlorophyll. Ether took up 2.438 per cent., consisting of coloring matter, a little tannin, globularin, chlorophyll and cinnamic acid. Chloroform yielded 11.365 per cent. of extract, containing tannin, coloring matter, and principally globularin and cinnamic acid. Alcohol now took up 30.55 per cent. of extract, containing, in addition to the principles mentioned, also glucose and mannit. Globularin is amorphous; it is precipitated from its aqueous solutions by iodine, bromine and tannin, but not by metallic salts; mineral acids decompose it into glucose and a resinous body, globularetin. This is soluble in cold alkalies and reprecipitated by acids; but after boiling the alkaline solution, acids produce a crystalline precipitate of cinnamic acid. Globularetin C_9H_6O is an anhydride of cinnamic acid, $C_9H_8O_2$. Globularin, when boiled with potassa and potassium permanganate, yields benzoyl hydride; and the leaves, when distilled with a limited amount of sulphuric acid and potassium bichromate, furnish a certain quantity of oil of bitter almond.

The branches yield to the solvents mentioned above much smaller amounts of extract.

Globularia vulgaris contains the same constituents, but the leaves

yield to carbon bisulphide 2.70, to ether 4.25, to chloroform 2.35, to alcohol 1.85, and to water 8.75 per cent. of extract. The volatile principle is present only in minute proportion.—*Jour. Phar. Chim.*, 1883, May, p. 361–366; *Amer. Jour. Phar.*, Sept. 1883, 467.

SCROPHULARIACEÆ.

Veronica Parviflora—*Value in Dysentery*.—Dr. J. Jardine has used this drug, known in China by the name of *koreniko*, in cases of chronic dysentery, and has obtained results far beyond his expectations. The remedy is used largely in New Zealand in dysentery and diarrhoea. The author employed the drug in the form of tincture, but the manner of its preparation, or dose, is not stated.—*Amer. Jour. Phar.*, Nov. 1883, 576.

Mullein—*Medicinal Properties*.—Mr. F. I. B. Quinlan draws attention to the mullein plant, which he described as being useful in the early stages of pulmonary consumption in a manner similar to cod liver oil or Russian koumiss. The particular mullein to which he referred, the *Verbascum Thapsus* of botanists, is frequently spoken of by ancient Irish medical writers, and has long been used in Ireland for the relief of phthisical patients. The preparation specially recommended is a decoction of the fresh leaves in milk, either in its natural state or previously peptonized. So great is the demand for this plant that it is cultivated in several parts of Ireland, and it would be interesting to ascertain the exact effect of cultivation upon it.—*Yearbook of Pharmacy*, 1883, 487–490.

SOLANACEÆ.

Belladonna Root—*Estimation of Alkaloids*.—Messrs. Wyndham R. Dunston and F. Ransom, after reviewing the methods hitherto proposed for the estimation of the alkaloids which exist in *Atropa Belladonna*, record the experiments made by them to establish a satisfactory process, and as a result recommend the following for the estimation of atropine and hyoscyamine in belladonna root. Twenty grams of the dry and finely powdered root are exhausted by hot percolation with a mixture of equal parts by volume of chloroform and absolute alcohol; if an extraction apparatus is used about 60 cc. of the mixture is required. The percolate is agitated with two successive 25 cc. of distilled water, which are separated in the usual way. These are mixed and well agitated with chloroform to remove the last traces of mechanically adherent coloring matter. The chloroform is separated, the aqueous liquid rendered alkaline with ammonia and agitated with two successive 25 cc. of chloroform, which are separated, mixed and agitated with a small quantity of water (rendered faintly alkaline with ammonia) to remove adherent aqueous liquid. The chloroform is then evaporated over a water-bath until the weight of the atropine and hyoscyamine is constant, which usually occupies a little less than one hour.

The special features which distinguish this process are, (1) it is simple and accurate; (2) a high temperature is avoided; (3) the solvent employed extracts a minimum of non-alkaloidal constituents; (4) no precipitants are used; (5) the use of acids is avoided; (6) the alkaloids are not heated with alkalies.

The root of *Atropa Belladonna* grown at Hitchin and carefully dried at 100° F. yielded 0.38 per cent. of total alkaloid (atropine and hyoscyamine) when estimated by this process. Other specimens estimated in the same way yielded 0.39 per cent. and 0.35 per cent. of total alkaloid.—Amer. Jour. Phar., May 1884, 277–284, from Phar. Jour. Trans., Feb. 9, 1884, 623.

Hyoscyamus Leaves—Odorous Principle.—In an interesting paper read before the British Pharmaceutical Conference, 1883, Mr. A. W. Gerrard reports that he has succeeded in separating the odorous principle of henbane leaves as a pale yellow, unctuous, semi-crystalline mass, which consists probably of a butyric ether. Mr. Gerrard expresses an opinion that the deposit which sometimes forms in tincture of henbane will be found to consist of a mixture of this principle and chlorophyll.—Yearbook of Pharmacy, 1883, 576–578.

Tobacco—Occurrence of Sugar.—Professor Attfield, having been asked the questions: “Does tobacco contain sugar or any similar saccharine matter?” “If so, how much?” procured eight authentic samples of tobacco leaves grown in different parts of the United States (Virginia, Kentucky, and North Carolina), and determined them all to contain notable percentages of sugar. The tobaccos grown in his own garden, collected from museums, etc., also contained sugar, though in the instance of the English-grown article, a mere trace of sugar was found in one sample, whilst in another, grown under more favorable circumstances, nearly two per cent. of saccharoid matter was found. Besides the saccharoid matter, properly termed *tobacco sugar*, the author found that tobacco contains about 3 per cent. of alcohol-yielding material, which is precipitated by basic acetate of lead, lime water, etc., and this is taken into account in the *total saccharoid matter*, as shown in the following table:

	IN 100 PARTS OF TOBACCO LEAF.	
	Tobacco Sugar.	Total Saccharoid Matter.
A.	7.00	9.87
B.	5.57	8.61
C.	7.76	10.94
D.	9.60	12.80
E.	7.43	10.20
F.	9.29	12.40
G.	5.57	8.23
H.	6.81	10.10
Average.	7.38	10.39

The author's observations incline him to the belief that the sugar of tobacco is peculiar. It appears to possess little, if any, action on polarized light. Such a fact would be of considerable importance in any examination of tobacco infusion for added sugar,—sucrose, glucose, lactose, etc.,—which all exert well-marked dextro-rotatory or lævo-rotatory power on polarized light. The commercial samples of tobacco he has recently examined, with scarcely an exception, yielded infusions which, even when colorless, did not perceptibly affect a polarized ray; therefore, with a bare exception, they were unadulterated by sugar. Certainly samples forwarded to him by officials of the customs in London, at the request of owners, did not contain added sugar. But the fact has, also, theoretical importance, for the existence of a *tabacose*, as we may term it, if it is a true sugar, having such properties, would point to the existence of a sub-class of fermentible but non-rotatory sugars. Possibly, however, the action of this fermentible substance on a polarized ray is only masked.

The isolation and complete chemical and physical investigation of the saccharoid principle or principles in tobacco remain to be accomplished. He should himself proceed with this work, but is assured by a friend that he has already commenced, and intends to complete and to publish the results of such a research.—*Amer. Jour. Phar.*, Mar. 1884, 147-150; from *Pharm. Jour. Trans.*, Jan. 12.

Tobacco.—Caffetannic acid a constituent, which see under "Organic Acids."

Potato.—Formation of a chromogen in the juice. See *Coloring Matters*, under "Organic Chemistry."

Withania Coagulans (*Puneeria Coagulans*)—*Investigation Regarding the Peculiar* (Rennet-like) *Ferment of the Seeds*.—Attention having been drawn to the peculiar rennet-like ferment contained in the fruit of *Puneeria coagulans* (see *Proceedings* 1883, 114), Mr. Sheridan Lea has made some experiments with a view to establishing the presence of a definite ferment, and the applicability of such to cheese-making purposes.

The material supplied consisted of an agglomerated dry mass of seed-capsules and fragments of the stalks of the plant. When crushed in a mortar the whole crumbled down into a coarse powder, in which the seeds were for the most part liberated from the capsules. The author picked out the larger pieces of stalk, sifted out the finer particles, chiefly earth and fragments of the capsules, and then by a further sifting separated the seeds from the other larger particles. The seeds appeared to be each enveloped in a coating of resinous material, presumably the dried juice of the capsules in which they had ripened.

Taking equal weights of the seeds, he extracted them for twenty-four hours with equal volumes of (i) water, (ii) 5 per cent. sodic chloride,

(iii) 2 per cent. hydrochloric acid, (iv) 3 per cent. sodic carbonate. Equal volumes of each of the above were added in an acid, alkaline, and neutral condition to equal volumes of milk, and heated in a water-bath at 38° C. The milk was rapidly coagulated by the salt and sodic carbonate extracts, much less rapidly by the other two; of the four, the salt extract was far the most rapid in its action. All subsequent experiments have shown that a 5 per cent. solution of sodic chloride is the most efficient in the extraction of the active principle from the seeds.

There is no doubt that the substance which possesses the coagulating power is a ferment closely resembling animal rennet.

I. A portion of the 5 per cent. sodic chloride extract loses its activity if boiled for a minute or two.

II. The active principle is soluble in glycerin, and can be extracted from the seeds by this means; the extract possesses strong coagulating powers even in small amounts.

III. Alcohol precipitates the ferment body from its solutions; and the precipitate, after washing with alcohol, may be dissolved up again without having lost its coagulating powers.

IV. The active principle of the seeds will cause the coagulation of milk when present in very small quantities, the addition of more of the ferment simply increasing the rapidity of the change.

V. The coagulation is not due to the formation of acid by the ferment. If some of the active extract be made neutral or alkaline, and added to neutral milk, a normal clot is formed, and the reaction of the clot remains neutral or faintly alkaline.

VI. The clot formed by the action of the ferment is a true clot, resembling in appearance and properties that formed by animal rennet, and is not a mere precipitate.

Having thus determined the presence of a rennet ferment in the seeds, the author endeavored to prepare an active extract, which should be applicable for cheese-making purposes. All the extracts of the seeds are of a deep brown color, and it appeared, therefore, in the first place desirable to obtain less highly colored, if not colorless, solutions, which should still be active. In this, however, he failed; but he has succeeded in preparing a very concentrated active extract of the purified seeds, so that it should only be necessary to add a very small quantity of the extract, in order to coagulate the milk and obtain a colorless curd. This he has done by grinding the dry seeds very finely in a mill, and extracting them for twenty-four hours with such a volume of 5 per cent. sodic chloride solution that the mass is still fluid after the absorption of water by the fragments of the seeds as they swell up. From this mass the fluid part may be readily separated by using a centrifugal machine (such as is used in sugar refining), and it can then be easily filtered through filter-paper; without the centrifugal machine the separation of the fluid from

the residue of the seeds is tedious and imperfect; 40 grams of the seeds treated as above with 150 cubic centims. of 5 per cent. sodic chloride solution, gave an extract of which 0.25 cubic centim. clotted 20 cubic centims. of milk in twenty-five minutes, and 0.1 cubic centim. clotted a similar portion of milk in one hour. When added in these proportions the curd formed is quite white. The presence of the coloring-matter is, however, perhaps on the whole unimportant, since even if a larger quantity of the ferment extract is added in order to obtain a very rapid coagulation, the coloring matter is obtained chiefly in the whey, the curd being white.

The question of preserving this extract also engaged the author's attention, and he found that by adding sufficient common salt to make the percentage to 15 per cent., and alcohol up to 4 per cent., the preparation would retain its activity very well. Amer. Jour. Phar., Mar. 1884, 160-164; Phar. Jour. Trans., Feb. 2, 1884, 606.

Duboisia myoporoides, R. Brown—*Description of the Leaves*.—J. Moeller made the following observations on the leaves; they resemble willow leaves in outline, attain a length of 12 cm. (4½ inches), and width of 3 cm. (1½ inch), are short petiolate, entire, the margin slightly revolute, and have a prominent midrib, the secondary veins diverging at nearly right angles and forming slings near the margin. A parenchymatic excrescence along the upper side, upon the midrib, is characteristic for the leaves, and may be observed with the naked eye. The upper epidermis has few stomata and somewhat smaller, flatter, and more thick-walled cells than the lower epidermis, which contains numerous stomata and scattered clavate hairs. On placing a microscopic section in warm potassa solution, a large number of acicular crystals make their appearance upon the lower, but not upon the upper side of the leaf. The crystals are soluble in water and alcohol, and make their appearance after the leaf had been kept for several hours in water, but not after it has been extracted with alcohol.—Phar. Centralhalle, 1883, No. 20; Amer. Jour. Phar., Nov. 1883, 569.

OLEACEÆ.

Olive Oil—Manufacture in Tuscany.—Mr. Inglis, consul at Leghorn, has furnished some interesting information in reference to the culture of the olive and the manufacture of the oil in Tuscany, from which the following is extracted: The olive tree in Tuscany generally blossoms in April. By November the fruit has attained its full size, though not full maturity, and the olive harvest generally commences then. The fruit, generally speaking, is gathered as it falls to the ground, either from ripening or in windy weather. In some districts, however, and when the crop is short, the practice is to strip the fruit from the trees early in the season. When there is a full crop the harvest lasts many months, and may not be finished until the end of May, as the fruit does not ripen

simultaneously. Oil made early in the season has a deeper color, and is distinguished by a fruity flavor, with a certain degree of pungency; while as the season advances it becomes lighter in color, thinner in body, and milder and sweeter in taste. Oil made towards the close of the harvest in April and May from extremely ripe fruit is of a very pale straw color, mild and sweet to the taste, though sometimes, if the fruit has remained too long on the trees, it may be slightly rancid. Oil very light in color is much prized in certain countries, notably in France; and hence, if it also possesses good quality, commands a higher price in the Tuscan markets.

The fruit of the olive tree varies just as much in quality as does the grape, according to the variety of the tree itself, the nature of the soil, exposure, and climate of the locality where it grows. The process of making the oil is fully described. It may be briefly stated to consist in mashing the fruit to a pulp and expressing in bags. The residue in the bags, after the first expression, is ground again, and expressed a second time. After this second expression, the pulp is beaten up with water, and collected in tanks, in which the kernels sink, whilst the pulp which collects on the surface is subjected to a third expression. After this expression it is sold for treatment in factories by the sulphide of carbon process, and by this method yields 7 to 9 per cent. of oil, suitable for manufacturing purposes only. Throughout the process scrupulous cleanliness and sweetness of the vessels and apparatus must be observed, and the oil, after each expression, must at once be separated from the water which is expressed along with it, otherwise its quality is impaired.

Mr. Inglis observes that there is no difficulty of obtaining good oil, but that much inferior oil is also produced and exported to England. The oil put up in Florence flasks, at the present time, is of the very lowest quality of Tuscany oil. *Phar. Jour. and Trans.*, May 17, 1884, 923-924.

Fraxinus Exelsior, Lin.—*Proximate Analysis of the Leaves*.—W. Gintle and F. Reinitzer found in the aqueous decoction of these leaves calcium malate and tannin, with smaller quantities of mannite and inosite, and still smaller quantities of quercitrin, dextrose, gum, and free malic acid. Fraxitannic acid is amorphous, yellow-brown, brittle, in powder golden yellow, deliquescent to a yellow-brown shining mass. It is insoluble in benzene, chloroform, and anhydrous ether, readily soluble in alcohol, acetic acid, ethyl acetate, and water, and precipitated from the latter solution, like other tannins, on saturation with common salt, but not by tartar emetic. Lead acetate gives a fine golden yellow precipitate easily soluble in acetic acid, becoming brown-green on exposure to the air and at the same time less soluble in acetic acid. Ferric chloride causes a brown-green color and precipitate, changing to blood-red by alkaline hydroxide, carbonate, or acid carbonate, the colors becoming dingy on exposure. Mercuric chloride causes a slight precipitate of calomel;

warming it with alkaline cupric solution throws down cuprous oxide ; heated with dilute acids or baryta water, no glucose is yielded. Dried in a vacuum at ordinary temperature its composition is $C_{12}H_{16}O_7$, and after heating to $100^{\circ}C$. in a stream of carbonic anhydride $C_{20}H_{20}O_{13}$, this anhydride being only slightly soluble in hot water.

A minute quantity of volatile oil was obtained, which had a strong and very pleasant odor like that of syringa flowers ; it boiled at $175^{\circ}C$. and had the composition $C_{10}H_{16}O_2$.—Amer. Jour. Phar., July 1883, 371 ; from Jour. Chem. Soc., 1883, p. 216–219. Monatsch. Chem. iii, 745–762.

COMPOSITÆ.

Mountain Sage ; Sierra Salvia.—*Description*.—J. Moeller gives the following description of this bitter aromatic drug : The stems attain about

FIG. 27.



FIG. 28.

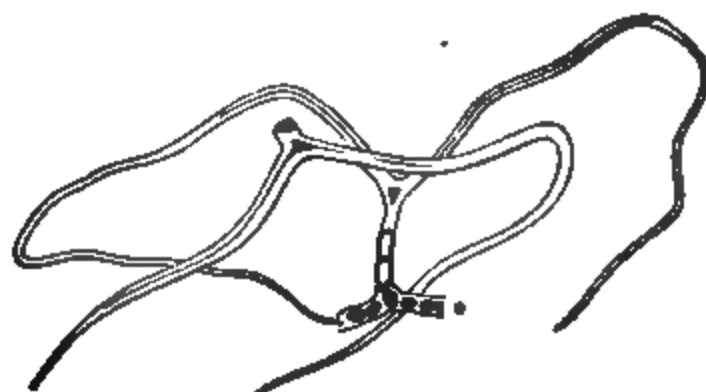


FIG. 29.

Leaf, natural size. Flowers, natural size. *Involucral scales, magnified.

the thickness of a quill, are somewhat angular, woody, and with leafy branches. The leaves are short, petiolate, divided antler-like, the upper

Fig. 30.



Hairs, magnified 125 diameters.

ones lanceolate or spatulate, sessile, scarcely 5 mm. ($\frac{1}{4}$ inch) long and 1 mm. ($\frac{1}{16}$ inch) broad. The erect, nearly globular, small flower-heads are on short pedicels in the axils of the leaves, either single or in small racemes. The outer involucral scales resemble the leaves ; the inner

ones are broader, ovate, three-cleft, membranous and long-ciliate. The receptacle is flat, long-villose, and bears a small number of yellow, tubular florets.

The hairs are quite characteristic, T-shaped; the basal cell projects somewhat above the dense cuticle, and is surmounted by two thin-walled stipitate cells and a terminal cell, which is forked, thick-walled, and shows an internal cavity only at the fork. The hairs are colored faintly yellow by aniline sulphate. The author doubts the identity of the plant with *Artemisia frigida*, Willdenow, which is indigenous to Siberia.—*Amer. Jour. Phar.*, Aug. 1883, 420, from *Phar. Centralhalle*, No. 17.

HYDROPHYLLACEÆ.

Eriodictyon Californicum, Benth — *Description of Leaves*. — The leaves are described by J. Moeller. They are leathery, lanceolate, about four inches (10 cm.) long, about half an inch (1 to 1.5 cm.) broad, short petiolate, repand-dentate, green and glossy above, dark reticulate and gray beneath. The upper epidermis is large-celled and covered with a mod-

FIG. 31.

Eriodictyon californicum. Transverse section of leaf. 250 diam.

erately tough and delicately wavy-furrowed cuticle, the grooves containing many-celled glands upon two- or three-celled stipes. The secretion of the glands is yellowish-green, resinous, soluble in alkalis, contains numerous needle-shaped crystals, and covers the upper surface sometimes to the thickness of .02 mm. Under the thick palissade layer is the mesophyll, composed of stellate cells, which, between the veins, are in contact with the small-celled epidermis of the lower surface; many of these epidermal cells are elongated to thin, gray, felt-like hairs. The primary nerves contain on the lower side a thick layer of collenchyma, and a pal-

issade layer is formed in the angles of the secondary nerves. The epidermis alongside of the nerves is smooth, and contains only few glandular hairs like those of the upper surface. The parenchyma is free from tannin; many cells contain groups of oxalate crystals. Strong alcohol takes up 30 to 40 per cent. of resin, having a tolu-like odor. W. H. McLaughlin obtained two resins, one of which was soluble in ether, bitter principle, gum, tannin, fat, volatile oil, sugar, and another crystalline principle.—Amer. Jour. Phar., Nov. 1883, 568, from Phar. Centralhalle, 1883, No. 19.

CONVOLVULACEÆ.

Scammony—Commercial Quality.—Mr. W. H. Symons states that a good article can generally be obtained (in England) at a fair price. A lot purchased as virgin scammony contained 83 per cent. of resin of characteristic odor, whilst a cheaper variety contained only 40 per cent., and was found to be heavily adulterated with starch.—Phar. Jour. and Trans., Jan. 19, 1884, 564.

Scammony—A Novel Adulterant.—Mr. Michael Conroy, in a paper read before the British Pharmaceutical Conference, 1883, draws attention to a specimen of scammony which appeared to consist of “skillip” scammony and upwards of 83 per cent. of the resin of the root.—Yearbook of Pharmacy, 1883, 566–567.

GENTIANACEÆ.

Gentiana Lutea—Microscopic Structure and Character of the Different Parts of the Plant.—Mr. Arthur Meyer gives a description of *Gentiana lutea*, entering very exhaustively into the details of the anatomical structure of the different parts. The paper, which on account of its great length is not suited for abstraction, is illustrated by 30 woodcuts. See Archiv d. Pharm., July and Aug. 1883, 488–506 and 561–576.

APOCYNACEÆ.

Apocynum Cannabinum—Isolation of Laticiferous Vessels.—Mr. Wm. C. McFetridge, working upon the *Apocynum cannabinum*, succeeded in isolating very readily the laticiferous vessels. The illustration (Fig. 32) shows this quite clearly on longitudinal section. A transverse section shows the same tissue in a very striking manner, with this difference, that in the latter case the vessels are seen as oval, isolated openings, containing bodies of granular matter inside a very delicate cell-wall. There are two special points about these vessels in this species: first, the ease with which they may be studied; and, second, their relation to the rather anomalous laticiferous vessels in the various cinchona barks.—Amer. Jour. Phar., March 1884, 131.

Strychnos Nux Vomica.—Isolation of a new Glucoside—*Loganin*—which see under “Organic Chemistry.”

FIG. 32.

Apocynum cannabinum, longitudinal section.

Nux Vomica.—Processes for *Standard Tincture* and *Extract*, which see under "Pharmacy," pp. 65 and 103.

Nerium Odorum.—*Characters of Bitter Principles*.—Mr. H. G. Greenish, at the meeting of the British Pharmaceutical Conference, read a paper on "The Bitter Principles of *Nerium odorum*." The author describes two substances, one crystalline and the other amorphous, and both freely soluble in spirit, separated from a solution obtained by shaking an aqueous percolate of the powdered root with chloroform until all the bitterness had been removed. The exact nature of these two substances will form the subject of a future report.—*Yearbook of Pharmacy*, 1883, 467-469.

Aspidosperma Quebracho.—*Physiological Action*.—The physiological effects of this remedy are summed up in "El Sentido Catol. en las Ciencias Med." as follows: 1. Quebracho diminishes the frequency of the respirations and cardiac contractions. 2. Its action appears to be principally directed to the heart, strengthening and regulating its contractions, either directly or by the influence of the nervous system. 3. This action is evident and immediate. 4. It is the only remedy which has a manifest anti-dyspnoeic action. 5. In nervous dyspnoeas it must be tried in a greater number of cases to judge of its action. 6. It probably produces the same effect in dyspnoea from acute affections of the thoracic organs. 7. The prolonged administration produces no alterations in other organs or functions.—*Amer. Jour. Phar.*, Dec. 1883, 639, from the *London Medical Record*, May 15, 1883.

Gelsemium Sempervirens—*Diagnostic Characters of the Stems and Roots*.—Mr. Jesse G. Shoemaker contributes two diagnostic characters in the stems and roots (say one-fourth of an inch in diameter) of *Gelsemium sempervirens*, which, so far as seen, are peculiar in their association, and which hence are of positive value. The first is derived from the medullary rays. These usually widen in a marked manner, going from the centre to the circumference, being *sometimes* much more than twice as broad exteriorly as interiorly. The second character is the tendency of the pith to be penetrated by several plates of large, thin-walled cells, which divide the pith more or less perfectly into four portions. This latter character, though as far as observed it varies considerably in the relations of the large cells and the ordinary pith cells, is always present, and plainly enough marked to serve as a means of diagnosis. Tests upon this point have been made on both fresh and dry specimens received at different times from different places. Figure 33 illustrates these peculiar-

FIG. 33.

Gelsemium, transverse section.

ities, magnified about 400 diameters.—*Amer. Jour. Phar.*, March 1884, 130.

EBENACEÆ.

Vegetable Tallow—A New Basis for Ointments, from Singapore.—Mr. E. M. Holmes draws attention to a vegetable fat donated to the museum of the Pharm. Society of Great Britain by Mr. R. Jamie, of Singapore. The new substance, which appears to be the product of different species of

Hopea, possesses the valuable property of not turning rancid, and makes a very good ointment on the simple addition of olive oil. At the ordinary temperature it is a white friable solid, softening into a pasty condition when rubbed between the fingers, and ultimately melting sufficiently to be rubbed in without leaving the hand very greasy. It has a very slight nutty odor and taste. The trees yielding the fat, which is known under the names of

Minyak Tankawang, or *Minyak Sangkawang*, are found in the S. and E. division of Borneo, chiefly in the neighborhood of Qualla Kapuas, and on the west coast, in the districts of Sambas and Mampawa. The preparation of the fat is very simple. When the ripe fruit falls on the ground it is collected, and allowed to germinate a little in a moist place. It is then dried in the sun until it becomes brittle. The fruit is then deprived of its shell and put into a rattan or bamboo basket suspended over boiling water. When it has been well steamed, the fruit becomes soft and plastic like dough. The fat is then expressed by squeezing the doughy mass in a cloth, and is poured into joints of bamboos, by which it receives the cylindrical form in which it is met with in commerce. Some Dyak tribes press the fruit by means of two beams. But it is probable that by neither of these processes is all the fat obtained. The trees begin to yield when they are about eight or ten years old, and the crops are somewhat irregular; but every four or five years an extraordinarily large crop may be counted upon, the fruit being ripe in December and January.

At the request of Mr. Holmes, Mr. E. Fielding has made a few preliminary experiments as to its melting point and solubility in various solvents. He reports as follows: "At 65° F. it remains a little solid: between 82° and 104° F. it has the consistence of flour paste; it fuses at about 118° F., but remains transparent and liquid at 112° F. It is soluble in about an equal weight of cold ether; it is sparingly soluble in cold acetic ether and acetone, but very soluble in these liquids when heated, the greater part being precipitated on cooling; it dissolves in half its weight of cold chloroform, but mixes with one-third of its weight of the same liquid when heated. In bisulphide of carbon, either cold or hot, it is extremely soluble. In cold benzol it is soluble to the extent of about 1 in 4. In hot benzol and petroleum spirit (hexane or heptane) it dissolves in all proportions, but the solution gelatinizes on cooling. It is very soluble in cold turpentine, and dissolves in it when heated in all proportions. In alcohol it is soluble to the extent of about 1 in 30 when cold, or 1 in 20 when hot, and in isopropyl alcohol it dissolves to the extent of about 1 part in 25 when cold, and 1 part in 4 when hot." Mr. Fielding thinks it may be compared in many respects with the fat of *Pentadesma butyracea* (*Clusiaceæ*), which should, however, judging from its natural odor, be more nearly allied to kokum butter (*Garcinea purpurea*).

—Pharm. Jour. Trans., Nov. 1883, 401; Amer. Jour. Phar., Jan. 1884, 19-21.

STYRACEÆ.

Benzoin—Trees Yielding the Varieties of Commerce.—Mr. E. M. Holmes read a paper before the British Pharmaceutical Conference, 1883, in which he gives some information respecting the trees yielding benzoin, and exhibited specimens of the leaves and sections of the trunk of the Siam benzoin tree, and leaves, flowers and fruit of the Sumatra benzoin tree which have recently been received from Mr. Jamie, of Singapore.—Yearbook of Pharmacy, 1883, 534-537.

Siam Benzoin—Botanical Source.—Mr. E. M. Holmes observes that the benzoin which enters into English commerce includes four varieties, named respectively Sumatra, Palembang, Penang and Siam benzoin. These exhibit certain characteristic appearances by which they are easily recognized, and three of them, namely, Sumatra, Penang and Siam benzoin, are probably derived from three distinct plants. The botanical source of Sumatra benzoin was determined by Dryander, and an account and figure of the plant were published by him in the *Philosophical Transactions*, for the year 1787, lxxvi., p. 303, but the trees which yield the other varieties have as yet never been identified with certainty. Through the courtesy of Mr. R. Jamie, of Singapore, Mr. Holmes is now in position to throw some light on the botanical source of Siam benzoin. Herbarium specimens of the leaves of the tree yielding the Siam benzoin, a young plant in the garden of Mr. Jamie and a young plant in the Kew gardens, all of undoubted origin, show the plant yielding Siam benzoin to be probably a distinct species, although nearly allied to *Styrax Benzoin*, Dry. The leaves are rather thinner, the lateral veins are fewer in number and the veinlets more prominent beneath, but it is necessary to wait until flowers and fruit are obtained before the exact species to which it belongs can be ascertained. Mr. Jamie has now the two growing together in his garden, and remarks in his letter, "Judging from what I have seen of the two kinds growing together, they are different."—Amer. Jour. Phar., Dec. 1883, 619-622, from Pharm. Jour. Trans.

ERICACEÆ.

Ericaceae.—Constituents.—Richard Thal prepared *ericolin* from 300 pounds of the herb of *Ledum palustre* by boiling it in a still with water, precipitating with acetate and subacetate of lead, freeing the precipitate from lead, evaporating to an extract and exhausting this with spirit of ether. Ericolin, $C_{26}H_{30}O_3$, is inodorous, brown yellow, sticky, hygroscopic, strongly bitter, very soluble in alcohol and ether-alcohol, very sparingly soluble in ether, chloroform and benzin, and gradually decomposed when in contact with water, the odor of ericinol being developed, sugar dissolved, and a brown powder separated, which aggregates into a

blackish-brown mass. This decomposition is rapidly effected by heating with dilute mineral acids, and ericinol, $C_{20}H_{20}O$, by combining with water, is further converted into *hydroericinol*, $C_{10}H_{20}O_4$. The latter is a thick fluid, brown yellow, of a peculiar strong odor, and a balsamic, not bitter taste; on keeping even in vacuo it becomes partly insoluble in ether. Prepared from *Calluna vulgaris*, ericolin differed somewhat from the preceding. By following the process given in outline above, and treating the ether-alcoholic extract with warm dilute sulphuric acid, the odor of ericinol was observed, and the presence of ericolin shown in *uva ursi* and 29 other ericaceæ—namely, 6 species of *Erica*, 10 of *Rhododendron*, 3 of *Vaccinium*, 3 of *Azalea*, in *Gaultheria Shallon*, *Pursh*, *Clethra arborea*, *Eriodictyon glutinosum*, *Epigæa repens* and *Ledum latifolium*. The last two species and the rhododendrons gave the strongest odor of ericinol.

The lead precipitate mentioned above contains *leditannic acid*, $C_{15}H_{20}O_8$, which, in addition to the properties described by Willigk (1852), was found to have a distinctly acid reaction and acidulous, astringent taste; it dissolves with difficulty in ether, more readily in acetic acid, and its aqueous solution precipitates cinchonine sulphate, dingy flesh-colored; lead acetate, light yellow; tartar emetic, brown; copper acetate, brown-black. Gelatin causes a copious precipitate, and silver nitrate is reduced. By dilute mineral acid it is split into water and *ledixanthin*, $C_{20}H_{24}O_{12}$; the latter is brown-red, sparingly soluble in water, and freely soluble in alcohol before drying.

The author prepared also *callutannic acid*, which resembles the above, but yields with gelatin only a turbidity. He instituted also comparative experiments with *pinipicrin*, and confirmed its close resemblance to ericolin, which had already been observed by Kawalier (1852), but could not prove the identity of the two compounds.—Phar. Zeit. Russl., 1883, No. 14-18, Amer. Jour. Phar., Sept. 1883, 468-469.

Ledum palustre—*Variation in Amount of Stearopten and Volatile Oil at Different Periods*—The crystalline stearopten from the volatile oil of this plant was obtained by Grassmann (1831), and farther examined by Trapp (1869), and Ivanov (1876), who obtained different results as to its composition. Hjelt and Collan have recently prepared this ledum-camphor, and obtained from plants grown in comparatively dry soil only a minute quantity of it, and no volatile oil, while the fresh plant from wet localities yielded .7 per cent. of oil, including camphor. The latter recrystallized from alcohol is nearly inodorous, and its ultimate analysis leads to the formula $C_{28}H_{44}O_2$, which comes near that ascertained by Trapp. The camphor melts at $101^{\circ} C.$, and crystallizes well from benzol, also by sublimation, when it is obtained in long white needles.—Amer. Jour. Phar., July 1883, 370, from Ber. d. d. Chem. Ges.

Andromeda Japonica—*Additional Constituents*.—In continuation of

his researches (see Proceedings 1883, 127-129), Prof. J. F. Eykman has subjected the yellow substance previously mentioned to nearer examination, and has isolated from it a substance resembling quercitrin, and another having all the characters of quercetin. These are described by the author as follows:

A. Asebo-Quercetin. Small, yellow needles, almost insoluble in boiling and in cold water, difficultly soluble in ether, easily in hot diluted alcohol. Easily soluble in alkalies, with deep-yellow color. This solution yields a copious, gelatinous precipitate, when acidulated with diluted sulphuric acid and, on the subsequent addition of sodium-amalgam, produces the fine paracarthamin-reaction (of Stein), which appears, however, intensely only after warming. The diluted alcoholic solution is colored green by ferric chloride, and the latter reagent also precipitates it completely. Concentrated sulphuric acid and hydrochloric acid color it deep orange-yellow. Ammoniacal solution of nitrate of silver, as well as warming with alkaline solution of copper, produces a copious reduction. Elementary analysis proves the identity of this substance with quercetin.

B. Substance resembling Quercitrin. This exhibited properties in many respects agreeing with those of quercitrin. But it differed by its more feeble power of reducing alkaline copper solution, by its more ready solubility in water, by the non-appearance of a precipitate on acidulating the solution, and by the appearance of the paracarthamin-reaction without warming. An elementary analysis made of this substance shows it to differ considerably from quercitrin, but this may be accounted for by the presence of a quantity of quercetin; a quantity of the latter having been indeed separated by further crystallization. No analysis of the purified principle has yet been made, on account of insufficient quantity. It exhibits the following properties:

Pale-yellow needles, difficultly soluble in boiling water, easily so in hot, diluted alcohol. Soluble in alkalies with deep yellow color. The aqueous as well as the diluted alcoholic solution yields an *orange-yellow* precipitate with acetate of lead, and a green color with ferric chloride. Ammoniacal solution of silver is strongly reduced, but ammoniacal solution of copper only *slowly on boiling*. The alkaline solution, when acidulated with diluted sulphuric acid, yields no precipitate. The acidulated solution, when shaken with sodium amalgam, produces an intense paracarthamin-reaction *without warming*. Both in the case of asebo-quercetin, and in that of the substance resembling quercitrin, the red color produced by sodium amalgam is changed to green by alkalies. Both are also colored green if sodium amalgam is added to their alcoholic solutions.

The author, furthermore, obtained from the reddish-brown mass remaining behind after treating the alcoholic extract with absolute alcohol, a brownish-black substance, which when simply air dry forms a

light-brown powder, and which he has named *asebo-fuscin*. It may be dried above 100° C. without fusing together to a resinous mass. It is insoluble in water, easily soluble in alcohol with a deep brown color, insoluble in ether and chloroform and boiling benzol, and very little soluble in amylic alcohol. It dissolves easily in alkalies, with a dark, brownish-yellow color. When warmed with alkaline copper solution, or with ammoniacal silver solution, it does not produce a plainly-visible reduction, but the solution acquires a dark color. The alcoholic solution diluted with water assumes a darker greenish brown color by ferric chloride. Acetate of lead or ammoniacal solution of chloride of calcium produces a dirty, brownish precipitate. Chloride of gold yields a dark, purplish-violet precipitate. Sodium amalgam produces neither a red color in acid, nor a green color in alkaline solution.

Elementary analysis points to the formula $C_{18}H_{18}O_8$ for this substance.

On passing hydrochloric acid gas into the alcoholic solution of *asebo-fuscin*, or on adding to it hydrochloric acid and warming, it assumes a handsome, intensely reddish-brown color. From this solution, water separates a dark-brown precipitate, which the author has named

Asebo-Purpurin.—On drying, this appears as a dark, blackish-violet powder which is insoluble in water, easily soluble in alcohol with a deep wine-red color, and also in solution of potassa, with a magnificent and intensely green color. Acetate of lead added to the alcoholic solution diluted with water, produces a greenish precipitate, ferric chloride a dirty brown color. Sodium amalgam does not change the color of the acid solution.—New Rem., Aug. 1883, 229–230.

Andromeda Polifolia, L.—*Identity of Poisonous Principles with that of A. Japonica*, Thunb.—Mr. P. C. Plugge, referring to his previous examination of the poisonous constituent of *Andromeda japonica*, Thunb. (see Proceedings 1883, 127–129), communicates the results of similar experiments with *A. polifolia*, L., which show the poisonous principle of the latter to be identical with that of the former—viz:

Andromedotoxin.—He has also isolated a second principle from *A. polifolia*, which on examination and comparison seems to be identical with the

Asebotin obtained by Prof. Eykman from *A. japonica*, Thunb., though further experiments with larger quantities of the material are necessary to establish their identity.—Arch. der Phar., Nov. 1883, 813–819.

COMPOSITÆ.

Raiz del Pipitzahuac—*Pipitzahoic Acid*.—Vigener has recently again drawn attention to the root of a composite plant, which, under the name of “Raiz del Pipitzahuac,” has for a long time been used in Northern Mexico as a powerful laxative. This action was found by Prof. Rio de la Liza (1855) to be due to a peculiar acid, which he named *pipitzahoic*

acid, and which Dr. Weld, an assistant of Professor Liebig, determined to have the composition $C_{20}H_{20}O_8$. The plant furnishing the root has been variously ascribed to be *Dumerilia Humboldtiana* and *Trixis Pipitzahuac*, but more recent investigations point out that it is a member of the genus "Perezia." Vigener has determined the following to be the most convenient method for extracting the acid. The roots, properly comminuted, are extracted with strong alcohol, in the proportion of 1 : 5. The tincture is mixed with boiling water until a precipitate begins to form, when, on cooling, the acid will crystallize out in small scales. The crystals are purified by resolution in cold alcohol, and the same treatment with boiling water. The pipitzahoic acid thus obtained appears to be an anthraquinon, and is characterized by the magnificent color-reaction with alkalies and alkaline carbonates. In the greatest dilution it produces with these a deep-red permanganate-of-potassium like color.—Phar. Zeit., 1883, 623, from Phar. Rundschau, Nov. 1883, 245.

Perezia Nana and Other Species—Description and Presence of Pipitzahoic Acid.—Mr. Charles Mohr, referring to the above, states that his attention was directed to the "Raiz del Pipitzahuac" in 1857, whilst a resident in Mexico, and that he at that time endeavored to determine its source. The determination of this plant has only recently become possible, Prof. Asa Gray having in his "North American Perezias," described the plant under the name of *Perezia Dugesii*.

After enumerating the different species of the genus "Perezia" found in the United States (7), Northern Mexico (7), Central Mexico (3), and Eastern and Southern Mexico (7 species), Mr. Mohr gives a description of two species occurring in the United States, *Perezia nana* and *Perezia Wrightii*, for both of which he is indebted to the kindness of Messrs. Lemmon and Pringle, zealous botanists who have spent the past season in the botanical exploration of Arizona and Southern California. The roots attached to several specimens furnished sufficient material to establish the presence of pipitzahoic acid, and the specimens, of great perfection, served as originals for the accompanying illustrations of these most interesting plants.

Perezia nana, Gr., (Fig. 34), of slender growth from 4 to 8 inches high, with a slender, creeping or ascending root-stock, articulated mostly, and the joints and head of which are covered with tufts of fine, woolly hairs. The slender wiry stem is simple or sparsely branched from the base, slightly flexuous, angled, and a little rough. The rigid, coriaceous leaves are shining, glandular, scabrous, strongly reticulate veined, roundish ovate, $1\frac{1}{2}$ to 2 inches wide, and but little longer, spinose toothed, sessile by a cordate base or amplexicaul. The large capitula are terminal, subsessile, 20-30 flowered, with a campanulate involucre of mucronate cuspidate, ciliated scales, arranged in three rows, of which the exterior ones are ovate and the interior lanceolate, all purplish towards the apex.

FIG. 34.



Perezia nana, Gray, nat. size. 1. Corolla, 2. Stamens, 3. Akene magnified, 4. Floret nat. size.

The akenes are whitish, glandular, puberulent, cylindrical, and have a pappus of copious hairs.

The root of a slightly bitter and astringent taste, imparts to strong alcohol a dingy yellow tint, which by the addition of a weak solution of a caustic alkali deepens to a clear deep yellow color. If a very dilute solution of sodic or potassic hydrate is carefully added, a faint and evanescent tint of impure purple color is perceptible, indicating the presence of small quantities of pipitzahoic acid combined with another substance. As would be expected by the deepening of the color, in consequence of the addition of an alkali to the tincture, this substance proved to be a tannic acid, ferric chloride producing an abundant precipitate of dark green color, which disappeared by the addition of oxalic acid. To obtain the pipitzahoic acid pure, the alcoholic tincture of the root was treated with boiling water, and the very minute quantity of a golden yellow crystalline precipitate washed by decantation. Examined under the microscope (see FIG. 35), it was seen to form stellate groups of

FIG. 35.

Pipitzahoic acid magnified 160 diam.

acicular or dagger-shaped golden yellow crystals characteristic of this compound, which by the addition of a drop of diluted solution of sodic hydrate are dissolved with the production of a beautiful deep violet color. Incomplete as the chemical investigation of the few decigrams of the root of this plant at command must appear, its results show that as a source of pipitzahoic acid, it is of but little value, which in reference to the therapeutical virtues claimed for this substance as a mild purgative, is further impaired by the largely predominating quantities of tannic acid with which it is associated. Of greater interest, in that respect, containing considerable quantities of pipitzahoic acid in an almost pure state, was found the following species:

Perezia Wrightii, Gr.—This is a robust plant from 1 to 2 feet in height, with a woody tap-root, on all sides covered by a dense cushion of long silky dark brown hairs; freed from these, if it is found more or less contorted, over an inch long and $\frac{3}{8}$ of an inch in thickness. The transverse section shows, when examined under the microscope, num-

FIG. 36.



at. size, 3. Flower head with bases
e), 4. Root deprived of woolly cover-
ing, 7. Atrane, 8. Stamen (magnified

erous fibro-vascular bundles, separated by the intervening cortical substance. Stem erect, simple below, corymbosely branched above, smoothish, the lower part covered by the leaves, which are membranaceous, 3 to 4 inches long, 2 to 3 inches broad, glabrous, strongly ribbed, unequally serrated and spinulose denticulate, closely sessile, with an auriculate or cordate base. Flowering heads numerous, small, with short, glandular hairy, subulately bracted pedicels, terminating in dense clusters, the branches of the open, nearly naked corymb, containing 8 to 10 flowers. Involucre small, scarcely exceeding, in length, the fruit; the scales to the number of 12 to 15, are rather membranaceous, greenish, viscid puberulent, the innermost oblong linear, the exterior shorter, oblong-ovate. Akenes 5 ribbed, somewhat fusiform, bearing a pappus of copious, soft, white capillary bristles.

The root is of a bitterish, not disagreeable taste. The alcoholic extract is of a pure deep yellow color; treated with an excess of boiling water it yields an abundant crystalline, golden yellow precipitate of pipitzahoic acid, which, by the addition of a dilute solution of caustic alkali shows the characteristic splendid reaction already described. From these observations it is evident that the roots of *Perezia Wrightii* will serve as a fit material for the preparation of this acid in larger quantities.

The author expects to receive a sufficient supply of the roots of *Perezia Wrightii* for the preparation of larger quantities of this highly interesting and peculiar organic constituent of the North American *Perezias*, so as to be able to study closer its properties, and obtain some light in regard to the uses to which it might possibly be applied in the laboratory and in the arts, as well as to permit of a closer investigation of its value as a remedial agent.—*Amer. Jour. Phar.*, April 1884, 185–192.

Perezia Root—Description, etc.—Mr. Thomas Greenish, having opportunity to examine some specimens of perezia root from which pipitzahoic acid is obtained, describes them as follows: the roots were in pieces from 8 to 10 cm. long, and 2 mm. thick, externally of a brown or reddish brown color, more or less furrowed longitudinally on the surface, apparently through the shrinking of the root in the process of drying; the taste was decidedly bitter, leaving a pungency on the tongue which remained after the bitterness had passed off, and this pungency was somewhat persistent.

In a transverse section of the root the yellow spots of pipitzahoic acid were visible to the naked eye, and more distinctly seen in their relation to the other parts when the section was slightly magnified with a lens. The outer cortical layer consists of a double row of thickened tabular cells, tangentially disposed and deeply colored: this is followed by a layer, several cells deep, of collenchymatous tissue, passing inward to the fundamental parenchyma of the root. The pipitzahoic acid is con-

tained in secreting cells, in groups of from three to five; the acid is in yellow lumps of a crystalline structure. These depositories of the acid, striking in the entire section, are arranged in a circle, and correspond to the fibro-vascular bundles. Stellate spots are scattered throughout the fundamental tissue from the collenchyma to the centre of the root, and are due to certain cells only of the tissue becoming thickened by secondary deposit, and converted into sclerenchymatous or stone cells with laminated structure, the inter-cellular spaces being filled with a dark colored deposit. These cells are found mostly single, but occasionally in groups of two, three, or more. A longitudinal section shows, in addition to the relative positions of the cells referred to, the more characteristic constituents of the root as pipitzahoic acid, and the dark deposit around the long stone cell traversing the length of the root.

Most of the parenchymatous cells contain grains of inulin, *Perezia* being one of the Compositæ, and containing inulin as the equivalent of starch present in the plants of other orders.

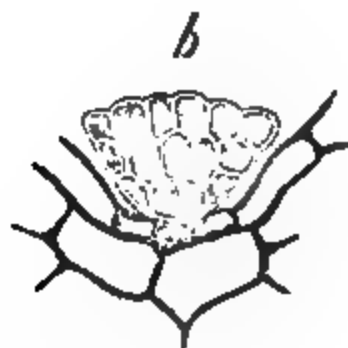
This brief account of the microscopical structure of the *Perezia* root will serve to make the more salient feature in its histology intelligible. The quantity of root placed at the author's disposal was only 2 gm., and that of acid 0.33 gm.; it must, therefore, be obvious that few experiments beyond those afforded by micro-chemistry could be undertaken.

A transverse section of the root in which the lumps of pipitzahoic acid were visible were subjected to micro-sublimation on a microscopic glass slide, and at a little over 100° C. the acid sublimed on the cover-glass in yellow crystals. An alcoholic tincture of the root, yellow from solution of the acid, brought into contact with a dilute solution of caustic alkali or alkaline carbonate, developed that fine purple color which induced Mr. Vigener to suggest a probable future for the acid as a color indicator in chemical investigations. The tincture, on evaporation, yielded crystals of pipitzahoic acid.—*Amer. Jour. Phar.*, April 1884, 193–195, from *Phar. Jour. and Trans.*, March 1, 1884.

Grindelia Robusta, Nuttall—*Microscopic Description*.—Mr. J. Moeller describes *Grindelia robusta*, Nuttall, as follows: The young parts of the cylindrical stem are covered with white, soft hairs. The leaves are thickish, sessile, more or less amplexicaul, spatulate-lanceolate, dentate, and pellucid-punctate. The secondary nerves are sparingly branched, and at some distance from the margin form slings. The flower heads terminate the branches. The involucre consists of several rows of narrow, spatulate, smooth, sharp-edged scales, which are curved back at the apex, and are covered with a brown, glutinous mass. The receptacle is somewhat convex; the florets are tubular, yellow, and hermaphrodite.

The resinous covering of the leaves is secreted by the glandular hairs, which are always simple, frequently with a double row of cells, and occasionally parenchymatic; the terminal gland is four-to several-celled. Sim-

FIG. 37.

a

Grindelia robusta; transverse section through upper surface of leaf, 250 diam.

Scaly trichoma, *a* from above, *b* section, 400 diam.

ilar but pointed hairs are likewise observed. The mesophyll is a loose tissue with indistinct palisade layer, supported by thicker-walled cell-rows, which extend transversely through the leaf. The thin-walled cells contain much tannin.

Quite characteristic trichomes are found upon the involucreal scales in depressions near the recurved apex, and consist of masses of cells without stipes.—*Am. Jour. Phar.*, Nov. 1883, 567, from *Phar. Centralhalle*, 1883, No. 19.

Xanthum Strumarium, *L.*—*Examination of the fruit.*—Mr. M. V. Cheatham has obtained from the dried fruit, besides a considerable quantity of saponifiable oil and of inert resin, a small quantity of substance which he considers the poisonous principle, but which is apparently easily decomposed by the action of alkalies. It is probably different from the

Xanthostrumarin of Zander, since it is not precipitated by picric acid, and is precipitated by tannin. The author observes that the cockle bur, in its young and tender condition, is frequently eaten by hogs, and that they almost invariably die after eating the young plants; warm lard and other fatty substances being used as an antidote with only poor success —*Amer. Jour. Phar.*, March 1884, 134.

Liatris Odoratissima, Willd.—*Microscopical Examination of the Leaves.*—Mr. W. Kerr Higley has subjected the leaves of this plant, specimens of which he obtained from Dr. Thomas F. Wood, of Wilmington, N. C., to microscopical examination. On receipt of the specimens the leaves were prepared in the following ways: 1. Some of them were placed in water. 2. A number were preserved in dilute alcohol. 3. Some were

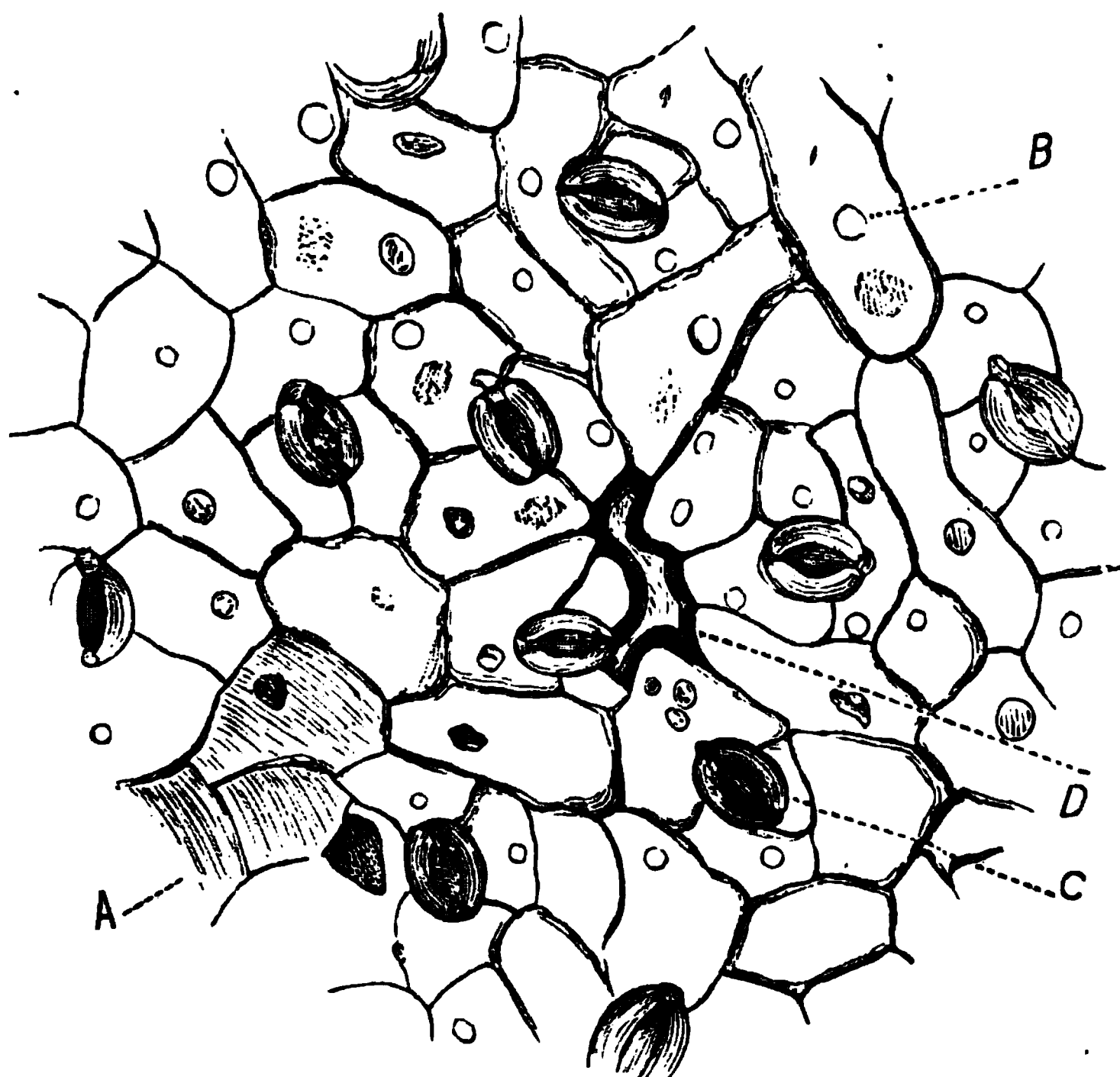
placed in strong alcohol. 4. Others were dried both with and without pressure. Sections were then made across the leaf at right angles to the midrib, and at various other angles, and also parallel to the same. These sections were examined in different media, with magnifying powers varying from one hundred to five hundred diameters.

That the structure of the leaf might be thoroughly understood, between two and three hundred of these sections were rendered clear for examination by placing them in a weak solution of caustic potash as a medium.

Besides the sections, several slides were prepared from both the upper and lower epidermis of the leaf. These slides were examined for the purpose of finding what products might be upon the surface, and also to study the shape and form of the cells and stomata. It was also hoped that this examination of the epidermis might lead to the discovery of the origin of the crystals and masses said to occur on the leaves.

Epidermis.—The cells of both the upper and lower epidermis are in-

FIG. 38.

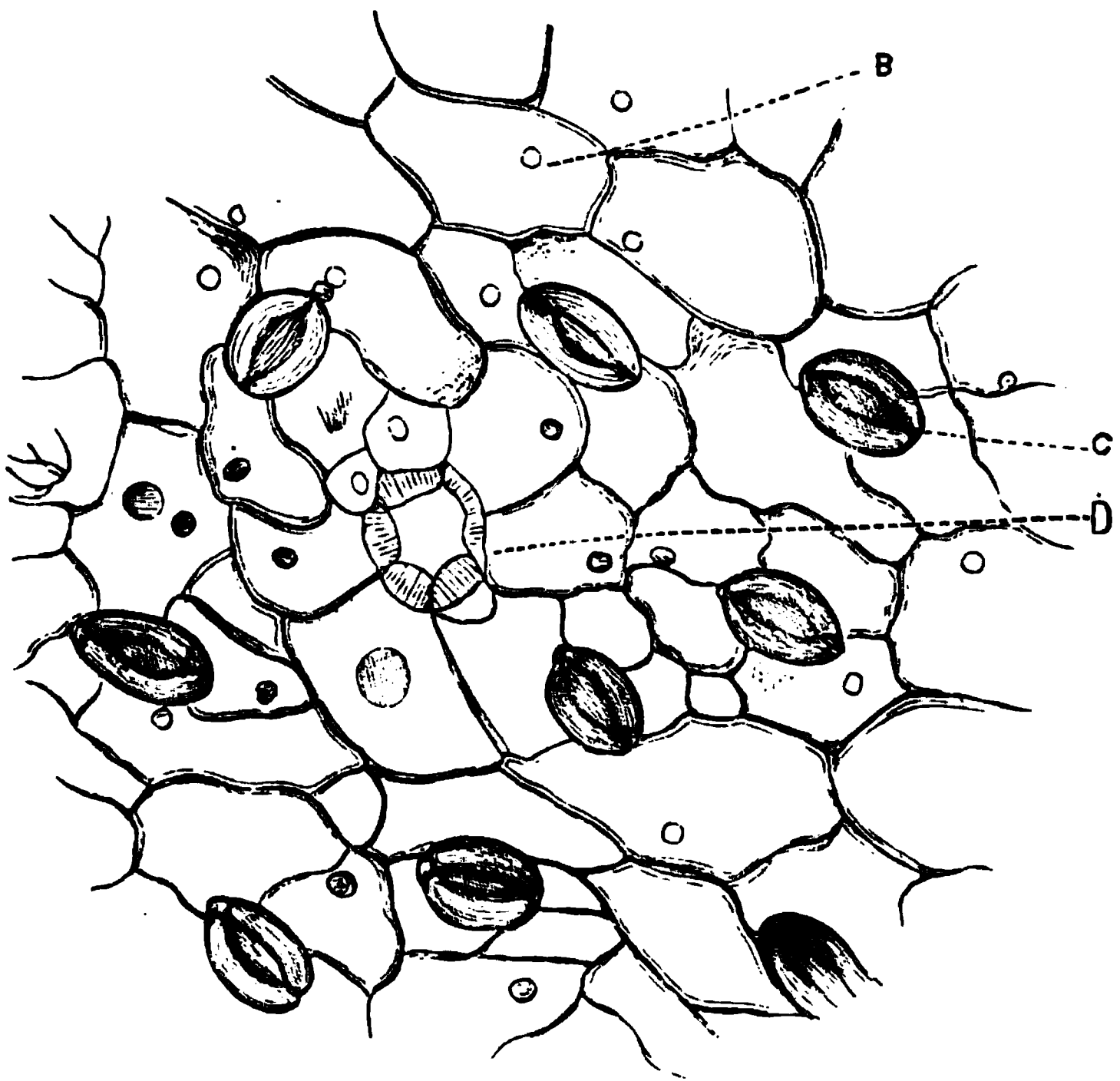


Liatris odoratissima, upper surface of leaf, 450 diam.

clined to be polygonal, and a number are distinctly hexagonal. They, however, vary very much in form. Those of the upper side (Figs. 38 and 39) are much more regular in outline, but vary more in size than

those of the under side. The latter (Fig. 40) are uniformly larger, and have more rounded angles. The cells appear finely striated, especially those on the upper side of the leaf (Fig. 38, *a*). Drops of oil are found in nearly all of the cells of both the upper and lower epidermis. Those of the upper side, however, seem to be more variable in size and more numerous (Figs. 38, 39, and 40, *b*). Numerous stomata are visible on both

FIG. 39.

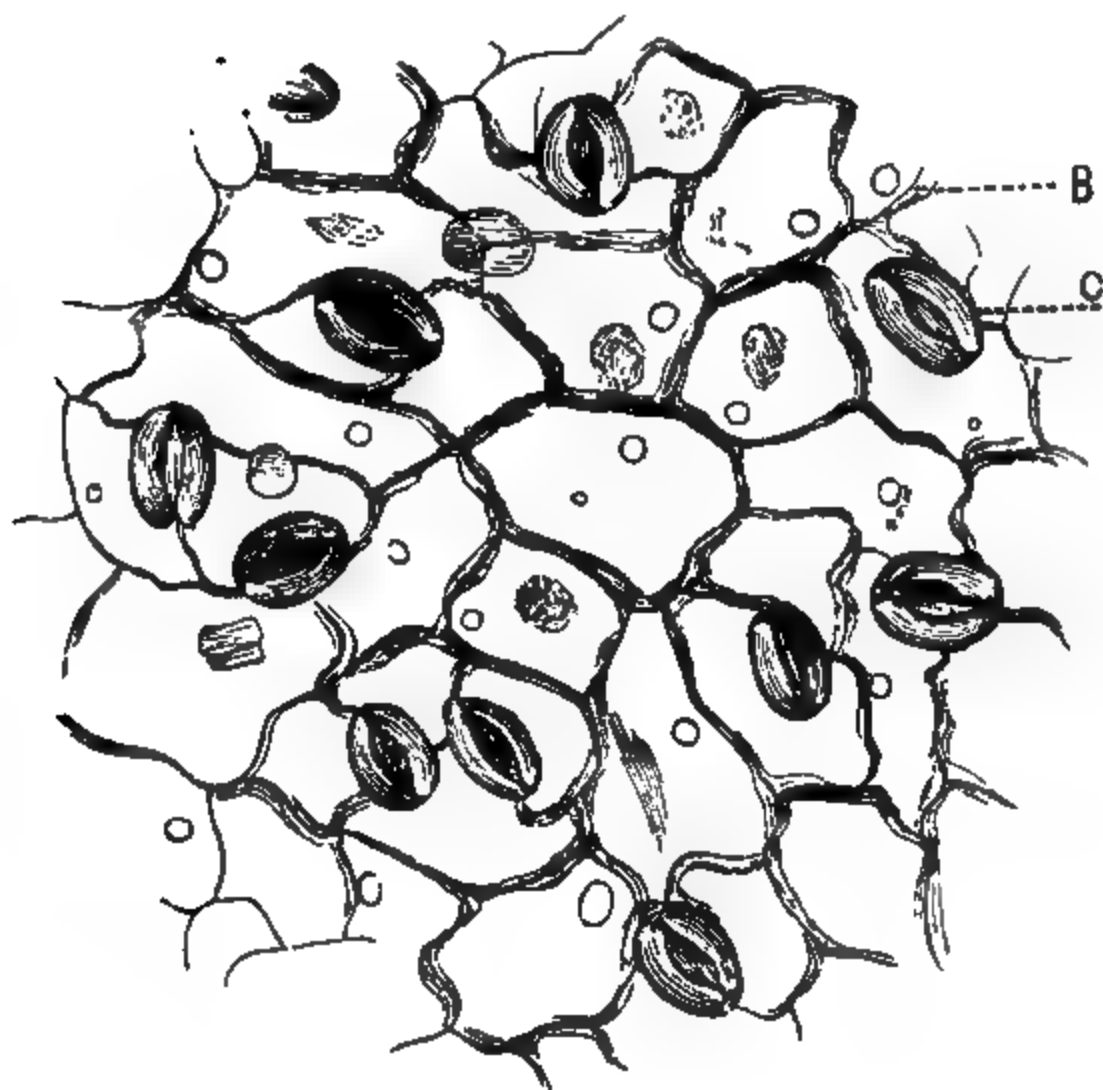


Liatris odoratissima, upper surface of leaf, 450 diam.

sides of the leaf (Figs. 38, 39, and 40, *c*). These are not so regular on the under surface as above. Scattered here and there, but quite numerous, are dark-yellow spots, which are very beautifully surrounded by tabular cells, arranged very symmetrically. These are the openings to the glands. As a rule, these openings were hexagonal, and with about the same radius in each direction (Fig. 39, *d*). But in a few cases they were much longer than broad, and very irregular in outline (Fig. 38, *d*).

Transverse Section.—The structure of the leaf is very readily studied by a section. The cells are very distinctly arranged in layers, as follows: 1. The upper cuticle and epidermis (Fig. 41, *a*). 2. A row of palisade cells arranged in a very regular manner, and very symmetrical in out-

FIG. 40.



Liatris odoratissima, under surface of leaf, 450 diam.

line (Fig. 41, *b*). 3. The cells of the mesophyll, which are more or less polygonal in outline, and do not vary very much in size (Fig. 41, *c*). 4.

FIG. 41.

A

B

C

Liatris odoratissima, transverse section.

The palisade cells of the under side, which are more irregular in size and arrangement than those of the upper side (Fig. 41, *d*). And, lastly, the

epidermis and cuticle of the under side, in which the cells do not have so regular an outline as those of the upper epidermis (Fig. 41, *e*).

Scattered through the cells of the mesophyll, and also in the palisade and epidermal cells, though not so commonly, are numerous drops of oil (Fig. 41). These drops of oil vary much in size and color; some of them being quite green, and others a decided yellow.

Here and there in both the upper and lower epidermis are deep indentations shaped very much like the graduated glass of the prescription desk. In these depressions are situated the glands. These glands rest upon a wedge-shaped cell of the epidermal layer, and are apparently three to five times divided by a thin membrane. In each one of these cells are drops of oil and a granular matter. The whole gland is covered with the cuticle (Fig. 41).

A fact of great importance is that the granular matter found within the gland is also found surrounding the gland and filling more or less the extra-glandular portion of the depression, and further, that in the older leaves the walls of the glands seem to be dissolved, and the whole mass is granular, and fills the depression above the level of the epidermis. Here and there in the mass is a distinct crystal (Fig. 42). It seems as

FIG. 42.

A

Liatris odoratissima, transverse section.

though this would explain the origin of the globular crystalline masses that are found upon the surface of the mature leaves.

Crystals.—In the examination of the epidermis, the author was rewarded by finding that by far the majority of the crystals were around or directly over the glands.

Under a small hand-lens the leaves appear much furrowed, and here and there over the surface rather clear crystalline masses could be seen. The largest of these masses, as a rule, did not appear to be more than one-thirty-second of an inch in diameter, though a few were at least one-twentieth. After removing some of these masses, it was evident that they

had been situated near or over the glands; and in the case of the opening of the gland shown in Fig. 39, this was a fact. A stronger magnifying power revealed numerous crystals upon the surface, which could be easily washed off. The crystals that "are sometimes found on the surface of the leaves in the green state as the plant reaches its greatest maturity" are, he is convinced, from the structure of the leaf and from the position of these crystals near the glands, mere exudations from the glands, in most cases, at least. He did not find that they were within the cells of the epidermal tissue, but upon the surface of the leaf. In only a few instances was there any evidence that these surface crystals were secreted from the cells. It is probable that the origin of these few crystals was similar to that of the crystals that are present in the mesophyll. The cells of this tissue contained rather large crystals, but they were not present, to any extent, except as the leaf dried or was very mature. They seemed to be produced by drying, and hence they were doubtless the products of the concentration of the cell fluids.

Many crystals are produced in the cells of plants as they grow old, and approach the stage of dissolution or rest. It is his experience that this is especially the case with organic crystals.—New Rem., Sept. 1883, 260–262.

Blumea Lacera, D. C.—Characters of the *volatile oil*, which see under "Organic Chemistry."

Sphæranthus Indicus.—Character of the *volatile oil*, which see under "Organic Chemistry."

Artemisia Abrotanum.—Presence of a peculiar alkaloid *Abrotine*, which see under "Organic Bases."

RUBIACEÆ.

Cinchona Cultivation—Failure in St. Helena.—Mr. D. Morris, Director of the Public Gardens and Plantations, Jamaica, reports the practical collapse of the cinchona acclimatization experiments in the island of St. Helena. After giving a detailed account of the various attempts and their results, he observes that the prospect for cinchona at first was full of promise; and indeed if the cultivation had been attempted at an earlier period when there was a larger area of indigenous forest to select from, and when plantations might have been established on the northern and more sheltered slopes of the central range, the result might have been very different. As it was, the plants put out on the terraces at the foot of Actæon's Peak, began to die off, and, driven to a last resource, the cultivation was ultimately confined to the narrow ridges of Actæon's and Diana's Peak, which, in many places, are only a few feet wide and fully exposed to the strong trade winds which usually blow in St. Helena for about nine or ten months in the year. Here the soil on the surface was of a promising character, being composed of rich vegetable humus formed

by the decayed leaves and stems of tree ferns and native plants. Below, however, there was nothing but a cold, wet, indurated or slightly friable marl, very unsuitable for the growth of cinchona, and which in Ceylon and India is known by experience to develop rot or canker in the roots, and to destroy every plant in contact with it. In his last report on the subject, dated December 12, 1871, Mr. J. H. Chalmer, the gardener, sent out from Kew, rightly attributes the large percentage of losses among the plants to the superficial nature of the soil, and reports that "they invariably died soonest in shallow ground, and, on the contrary, lived longest where the soil was of the greatest depth." Further, he remarks, "there is nothing, either in the climate or situation, of an unsuitable character; the soil alone seems to be at fault, being insufficient for the further development of the plants."—Phar. Jour. and Trans., June 21., 1884, 1031-1032.

Cinchona.—Cultivation in Bolivia.—In Bolivia, since 1878, according to the report of the Netherlands Consul, private individuals and land owners have taken up the question of replanting denuded cinchona forests, with great earnestness, and at the present time on the banks of the Mapiéi, in the department of La Paz, there are over a million of young trees growing. New plantations have also sprung up in various other localities, either on private ground or that owned by Government. The competition of India and Ceylon in supplying the markets, has had also the effect of inducing more care in collecting, and also of revisiting old spots, often with the result of rich harvests of bark which had been left on partly denuded trunks, and the opening of new localities. The new shoots springing up from the old stumps have yielded much quill bark, and the root bark of the old stumps has also been utilized. The replanting entails very little expense, and it is feared by some that should this new venture be successful, it will prove a dangerous rival to the plantations of India, Ceylon and Java, and lower the price of bark considerably. Phar. Jour. and Trans., June 28, 1884, 1054.

Cinchona Culture in Java.—An interesting account of the harvesting, stripping, and drying of cinchona bark in Java, taken from Van Gorkum's "Handbook of the Cinchona Culture," is given in New Rem., Nov. 1883, 346-347.

Cinchona Cultivation in Guatemala.—The Republic of Guatemala has arranged with a well-known Ceylon planter, Mr. W. Forsyth, to select seed for 5,000,000 cinchona trees, and Mr. F. is engaged in selecting the best Central American sites.—New Rem., Dec. 1883, 367, from Chem. and Drug.

Natural and Renewed Succirubra Bark—Analysis.—Mr. John Hodgkin has determined the alkaloids in a parcel of Ceylon succirubra quill bark. The parcel consisted of entirely natural bark, of entirely renewed

bark, and of pieces in which the natural and renewed bark were in juxtaposition. The most interesting result obtained was in the case of the last-named bark. In this the water of hydration was found larger in the renewed portion [15.96 %] than in the natural portion [14.61 %], but the percentage of the alkaloid was greater, being 4.285 %, whilst the natural portion contained only 2.910 %. The entirely natural bark contained 3.608 % of total alkaloid, and the entirely renewed bark 6.116 %.—Phar. Jour. and Trans., Dec. 22, 1883, 481.

Calisaya Bark—Discovery of a New Constituent—Cinchocerotin, which see under "Organic Chemistry."

Cinchona—Analysis of India Barks.—Dr. B. H. Paul communicates the results of the analysis of 43 specimens of cinchona bark cultivated in India, for which reference must be had to Phar. Jour. and Trans., Feb. 23, 1884, 666–667.

Cinchona—Correction to the Assay Process of the Germ. Pharm.—The process given in the German Pharmacopœia requires that three cubic centimeters of normal (volumetric) hydrochloric acid should be added to 120 grams of liquid poured off in the first step of the process. Prof. Flückiger draws attention to the fact that the resulting volume is too small. Either the liquid must be evaporated to dryness and the hydrochlorates of the alkaloids again brought in solution with 30 cc. of warm water, or—what is preferable—30 cubic centimeters of one-tenth normal hydrochloric acid are to be used in the beginning and the volume afterwards concentrated to 30 cc., when the ether and alcohol is distilled off. Both of the latter must be absent when the caustic potash is added.—New Rem., Sept. 1883, 274, from Pharm. Zeit., 1882, No. 97.

Cinchona Bark—Assay.—Prollius has shown that the whole of the alkaloids of cinchona bark may be obtained in solution by treating, say 40 grammes of the powdered bark with 800 gm. of a mixture composed of,

Alcohol, 95 %	67 parts.
Ether, sp. gr. 0.724	733 "
Water of ammonia	32 "

Comparative experiments have shown Mr. A. Pettit that the bark must be in as fine powder as possible, and that, if the mixture be shaken every five minutes, the exhaustion is as complete after one hour, as it will be after five or six hours if merely macerated.

The next step is to pour off 600 gm. of the liquid, corresponding to three-fourths of the alkaloids contained in the bark, that is, representing 30 gm. of the latter.

Now add to the ethereal liquid enough of a solution containing one-fourth of its weight of sulphuric acid, so that the aqueous layer which separates shall be just acid. In general, about 20 cubic centimetres will be sufficient.

This aqueous layer contains all the alkaloids of the ethereal liquid.

The layer is separated by a suitable funnel [in fact the ethereal liquid should be in a separating funnel when treated with the acid], and the ethereal liquid again agitated with 5 cc. of the diluted acid and 15 cc. of water. This portion is likewise separated, and added to the former.

Now heat the aqueous liquid on a water-bath in order to get rid of the dissolved ether, then dilute it with two volumes of water, and precipitate with caustic soda in excess. On stirring with a glass rod, the alkaloids coalesce together in a mass. The same result may also be obtained by warming the liquid on the water-bath.

Transfer the alkaloids to a tared capsule and dry them at a temperature of 100° C. (212° F.).

If the liquid is not perfectly clear, it is passed through a tared filter, and the gain in weight of the latter when dried at 100° C., added to the alkaloids in the capsule.

We have now the weight of the total alkaloids contained in the 30 gm. of bark, and from this we may calculate the quantity contained in 1 kilogramme.

The next step is to ascertain the proportion of alkaloids soluble in ether. Proceed as follows:

Dissolve the total alkaloids in a slight excess of sulphuric acid. Add 25 cc. of ether (sp. gr. 0.724) and 5 cc. of water of ammonia, and shake. The alkaloids soluble in ether are thereby taken up. Decant the ether; shake again with 10 cc. of ether and decant again. Unite the ethereal solutions, let stand 15 minutes, so that the alkaloids which are but little soluble in this menstruum may deposit; decant again, and shake the clear, decanted ethereal liquid with 10 cc. of diluted sulphuric acid (1 in 20). Separate the aqueous liquid; agitate the ethereal solution with 5 cc. more of the dilute acid, and add the second aqueous layer to the first.

Dilute the united liquids with water to 25 cc., heat to boiling, and saturate with pure diluted water of ammonia (1 in 5). As soon as the reaction is faintly alkaline, the heating is interrupted.

The sulphate of quinine will now separate in fine, needle-shaped, crystals.

When completely cold, collect it upon a tared filter, and wash it with a cold-saturated solution of sulphate of quinine; finally dry it at 100° C. (212° F.), until the weight remains constant.

We now have the weight of sulphate of quinine obtainable from 30 gm. of bark, and, therefore, by a simple calculation, that contained in one kilogramme.

In order to prove that the sulphate of quinine thus obtained is pure, the salt is dissolved with the aid of sulphuric acid, and examined by the polariscope.

If the rotary power does not approach sufficiently close to -238.3 , with sodium light, at a temperature of 15° C., the salt must be purified by a renewed treatment with ether and ammonia and recrystallization.

According to the author's experience, the polarimetric deviation is proportional to the quantity of salt dissolved; the amount of sulphuric acid does not influence this deviation, provided it is present in at least sufficient quantity to form bisulphate of quinine.

In practice, he prefers a solution containing one gm. of basic sulphate dried at 100° C., dissolved in two cc. of one-tenths per cent. sulphuric acid, and enough distilled water to make twenty cc. Under these conditions the polariscope deviation is to -110° (for pure sulphate of quinine at 15° C.). According to his experiments, it is necessary to add to the observed degree about one degree for every four degrees of temperature above 15° C.

These different treatments by acid, and the separations of the ether, are very rapidly performed if the operator has had some previous practice in these manipulations. A few hours are sufficient to make a complete assay of cinchona by this process.—Amer. Drug., June 1884, 109.

Red Cinchona Bark—Aqueous Extraction.—Professor Redwood communicates, as the result of his investigations and experience, formulas for extract and liquid extract of cinchona (which see under their respective headings, pp. 63 and 72) which formulas are based upon the following observations:

1. That the red, or succirubra bark is the sort most suitable for use in these operations.

2. That the extracting liquid should be water, an acid being used to render the active medicinal constituent of the bark soluble in this menstruum.

3. That the bark should be exhausted of its alkaloids in the process adopted, and that the extract should contain such other constituents of the bark as are considered to be medicinally valuable.

4. That the liquid extract should contain a specified quantity, say 5 per cent., of the mixed alkaloids of the bark.

5. That the liquid extract should admit of dilution with water without becoming turbid, and, on the other hand, that it might be evaporated to dryness without impairing the solubility to any appreciable extent.

The author gives some interesting details of the methods pursued to accomplish these results, for which reference may be had to the original paper.—Phar. Jour. and Trans., April 5, 1884, 797-798.

Cinchona—Difficulty to Exhaust by the B. P. Process for the Tincture, which see under "Pharmacy," p. 100.

Brazilian Coffee Tree—Proximate Examination of the Fruit.—Dr. Th. Peckolt has examined the fruit of this tree, a portion of the investigation having been made and published in 1864.

	Weight of berry.	Pulp.	Mucilage and testa.	Coffee bean.	Ash of pulp.
Fresh,	1.780	.658	.282	.840 gm.	1.717
Dried at 100°C.,	.584	.159	.150	.272 "	27.750

The fresh pulp contains in 1,000 parts,

Cafféine . . . . .	.270
Dark yellow, thick oil	5.000
Wax and red violet color	5.550
Soft resin, yellow, inodorous, tasteless, insoluble in alkalis	1.240
Resin, brown yellow, insoluble in ether, sparingly soluble in alkalis	15.900
Coffeotannin, not identical with that of coffee beans	14.620
Citric acid, tartrates, malates, trace of gallic acid	7.950
Glucose	67.400
Albuminous matter	11.100
Extractive matter	34.860
Pectin, mucilage, dextrin, salts	40.890
Water	759.800
Ash	17.170

The ash is interesting for containing iodine, as shown by C. Weinhold, in 1865, who found 0.882 per cent. The author has met with it constantly, the percentage varying between .474 and .105, but in other parts of the tree it could not be detected. The ash of the pulp contains also large amounts of phosphoric acid 9.987 per cent., ferric oxide 11.38 per cent., and silica 15.162 per cent.—*Amer. Jour. Phar.*, Nov. 1883, 567; from *Zeitsch. Oest. Apoth. Ver.*, 1883, No. 22.

Coffee—Physiological Action.—According to the result of experiments recently made by Messrs. Couty and Guimaraés to ascertain the precise physiological action of coffee, that beverage is not a preventer of tissue-waste. The maintenance of nutrition is, no doubt, improved by its consumption, as Gubler asserted; but simply because it involves an increased assimilation of nitrogenous food through improving the appetite, when not taken in excess, and thereby encouraging its consumer to take nutritious food.—*Amer. Jour. Phar.*, Mar. 1884, 160; *Louisv. Med. News*; *Brit. Med. Jour.*

Psychotria (Cephaëlis) Ipecacuanha—Microscopic Structure and Character of the Different Parts of the Plant.—Mr. Arthur Meyer gives a very exhaustive description of the ipecacuanha plant, going into the details of the anatomical structure of the leaves, stem, root, etc. The paper is accompanied by 41 illustrations, and on account of its great length is not suited for abstraction.—See *Archiv d. Pharm.*, Oct. 1883, 721-745.

Hymenodictyon Excelsum—Alkaloid and Neutral Principle.—In a former paper (see *Proceedings*, 1883, 137) Mr. W. A. H. Naylor gave some preliminary results respecting a bitter alkaloidal substance that he had isolated from the bark of this cinchonaceous plant, and which he then thought to be closely allied to, if not identical with paracine. Further investigation has proved it to be a new alkaloid having a composition

corresponding to the empirical formula $C_{22}H_{24}N_2$, and therefore an addition to the small class of bases devoid of oxygen. Besides "hymenodictyonine," which is the name given to the new alkaloid, Mr. Naylor has separated a bitter neutral principle, represented by the formula $C_{22}H_{24}O_{10}$, which he thinks may possibly be a decomposition product of a glucoside.—Yearbook of Pharmacy, 1883, 493-496.

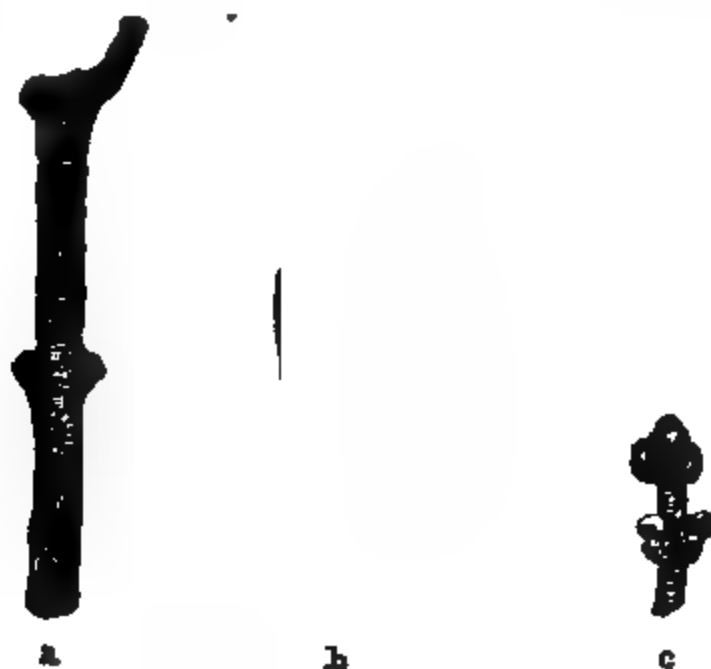
ARALIACEÆ.

Ivy Berries—*Proximate Constituents*.—The fleshy part of the fruit contains, according to A. Jandous, 70 per cent. of water; a dark red coloring matter soluble in alcohol and water, turned greenish by ammonia and light red by hydrochloric acid; a greenish-yellow resinous matter, sweet at first, but afterwards sharp and bitter; also grape sugar, gum, albumin and mineral matters. The seeds contain albumin, inorganic matter, and a fat oil with a characteristic herbaceous and irritating taste, precipitated by lead acetate, and slightly by lime water, and colored green by ferric chloride. The poisonous properties of the fruit are neither due to the resinous matter in the pulp, nor to the oil in the seeds.—Amer. Jour. Phar., July 1883, 271, from Jour. Chem. Soc., 1883, 499.

LORANTHACEÆ.

Phoradendron Flavescens, Nuttall, *Mistletoe*—*Description*.—The drug, consisting of dried stems, leaves and flowers, has been examined by J. Moeller. The stem fragments *a* are of the thickness of a quill, and about the length of a finger, varying in color between gamboge-yellow and

FIG. 43.



Phoradendron flavescens, Nuttall. *a* stem, *b* leaf, *c* pistillate spike.

blackish brown, wrinkled and with opposite leaf-scars. The cuticle is thick, on the youngest branches beset with short conical thickened hairs,

frequently in pairs; the bark is relatively thick, contains groups of stone cells and light-colored bast bundles arranged in a circle, and is free from starch; the wood contains starch in the pith, in the medullary rays, and in the scattered wood parenchyma cells. The leaves are smooth, when full grown, oblong or roundish elliptic, about 6 cm. long, sometimes spatulate, short petiolate, leathery, with the margin entire, the upper surface finely wrinkled and without visible nervation, the lower surface distinctly three-nerved, and the nerves sparingly branched. The cuticle is thick; the epidermis consists of polygonal cells, and has on the lower surface numerous stomata; there is no distinct palisade layer, the mesophyll consisting of thin walled, loosely united cells with a few intercellular spaces, and containing tannin, mostly also yellow resin, and in scattered cells near the fibro-vascular bundles, also crystalline groups of calcium oxalate.

The flowers are axillary, in whorled spikes, quite small, somewhat imbedded in the axis, three cleft, the pistillate ones in two or three whorls, with a hypogynous one-celled ovary and a two-lobed stigma; the staminate flowers longer and denser with three stamens united to the base of the perianth.—Amer. Jour. Phar., Aug. 1883, 431, from Phar. Centrahalle, 1883, No. 14.

UMBELLIFERÆ.

Conium—*Substitution*.—Mr. Mader reports that a parcel of this season's conium herb examined by him consists entirely of two other common umbelliferous plants, *Anthriscus sylvestris* and *Chærophyllum temulum*. Not a trace of conium was found in the parcel. On boiling a portion of the sample with caustic soda, a hay-like, not mousy, odor was produced. Pharm. Zeitung, 1883. New Rem., Nov. 1883, 329.

Ammoniac—*Hypobromite of Sodium a Reagent*.—Mr. P. C. Plugge, referring to the observation of Picard (1852) that hypochlorite of sodium is a sensitive reagent for ammoniac resin, draws attention to the value of hypobromite of sodium for the same purpose, and gives the details of experiments which prove the adaptability of the new reagent for the qualitative and quantitative determination of ammoniac, when in admixture with other gum-resins. The reagent is made by dissolving thirty grams of pure caustic soda in water, adding twenty grams of bromine, observing that the solution be well-cooled during this addition, and then bringing the whole to the measure of one liter. A few drops of this solution when added to a solution of ammoniac in soda solution (or in alcohol or ether), produce a magnificent violet-red color, which again disappears rapidly, and may be reproduced by repeated additions of the hypobromite, until, finally, the color can no longer be produced. On this behavior the author bases a process for the quantitative estimation of the gum resin. He finds that the reaction is due to the resin of the

ammoniac. Qualitatively the ammoniac can be determined in admixture with asafoetida, galbanum, benzoin, mastic, sandarak, shellac, pine-resin, amber, scammony, jalap-resin, etc. Quantitatively in all of these with the exception of galbanum. In the presence of the latter, the results are invariably too high, notwithstanding the fact that galbanum by itself does not produce the coloration with hypobromite. The author also gives the composition of the ammoniac used in his experiments, and a comparative table, showing the results of analyses obtained by Bucholz, Braconnot, Moss, and Hirschson. The author's results of analysis are as follows:

Volatile oil, 1.27% ; water, 5.10% ; ash, 2.00% ; resin, 65.53% ; gum, etc., 26.10%. The determination of the resin was both by his quantitative method, with hypobromite, and by direct extraction with ether, and gave closely agreeing results.—Arch. d. Phar., Nov. 1883, 801-813.

Laserpitium Latifolium—*Examination of Bitter Principle*. See *Laserpitin*, under "Organic Chemistry."

Thapsia Resin—*Composition*—Mr. F. Canzoneri observes that the root of *Thapsia Garganica* yields to boiling alcohol a white, amorphous, waxy substance, slightly soluble in ether and carbon bisulphide, and melting, after purification, at 90°. This substance, however, forms but a small part of the thapsia root. More abundant and important constituents are obtained by treating the dried and chopped root in a percolator with ether, whereby a yellow solution is obtained, which, on distilling off the ether, yields an amber-colored, syrupy resin, possessing strong vesicating properties. This acid residue dissolves in strong aqueous potash at ordinary temperatures, and in dilute potash when heated—in both cases with great rise of temperature—and, on neutralizing the resulting solution with hydrochloric acid, a yellow curdy precipitate is formed, having an unpleasant odor, and consisting of a mixture of liquid and solid ethers and fatty acids, together with resinous substances. From this mixture of products the author has obtained: (1) An octoic or caprylic acid, $C_8H_{16}O_2$. (2) A new acid of the series $C_nH_{2n-2}O_4$, which he designates as thapsic acid. (3) A non-azotized, neutral, vesicating substance.

This last constituent was obtained in very small quantity only, and in some preparations was altogether absent; it is moreover very difficult to purify from resinous substances and wax, by which it is generally accompanied. It dissolves in hot alcohol, and separates on cooling in shining needles melting at 87°; also in ether and in carbon bisulphide; all its solutions possess vesicating properties. Heated with strong potash-lye, it dissolves partially and is precipitated in the crystalline state on diluting the solution with water. It is not altered by boiling with strong acids. Heated on platinum foil, it burns away without residue, emitting a pleasant odor.

Thapsic Acid, $C_{10}H_{18}O_4$, is obtained by pressing between paper the

curdy precipitate formed on adding hydrochloric acid to the solution of the resin in aqueous potash, and crystallizing it several times from boiling alcohol with addition of animal charcoal. It forms white shining scales melting at $123-124^{\circ}$, nearly insoluble in water, benzene, and carbon bisulphide, soluble in alcohol, less soluble in ether. When strongly heated, it distils without alteration; ignited on platinum foil, it burns with an odor of burnt wax. It is but slowly attacked by bromine or by nitric acid.

Octoic or Caprylic Acid, $C_8H_{16}O_2$.—On distilling with steam the oily precipitate obtained by neutralizing with hydrochloric acid the potash solution of the ethereal extract of the resin, after removal of potassium thapsate and dilution with water, there passes over a yellow transparent oil, lighter than water. On exhausting this oil with ether, drying the etheric solution with calcium chloride and distilling, the greater part goes over at $220-236^{\circ}$; and on fracturing this portion at intervals of $5-5^{\circ}$, three other fractions are obtained, the most abundant of which is a colorless liquid soluble in alcohol and ether, and solidifying when cooled with snow, in flexible laminæ melting at ordinary temperatures. The product thus obtained is shown by analysis to have the composition of an octoic acid, and in its melting and boiling points it agrees nearly with the octoic acid obtained by saponification of cocoanut oil, and by oxidation of the octyl alcohol from heracleum oil, melting at 16° , boiling at $236-237^{\circ}$, which agreement the author has further confirmed by examination of the sodium, barium, and zinc salts.

The author suggests that thapsic acid may be a *dioctoic acid*, $C_8H_{16}O_2 \cdot C_8H_{16}O_2 = 2C_8H_{16}O_4 - H_2$, formed from the octoic acid by slow oxidation in the body of the plant.—*Amer. Jour. Phar.*, June 1884, 325-326; *Gazetta*, 13, 514-521; *Jour. Chem. Soc.*, April 1884, p. 460.

ARALIACEÆ.

Ginseng—Collection in Minnesota.—Mr. John L. T. Davison gives some interesting particulars in reference to the collection of ginseng in Minnesota. It is collected so assiduously that the time seems not distant when the plant will be exterminated in this section, just as it has been in others. The ginseng is brought to the market green and dry, washed and unwashed, and sometimes, if in small quantities, strung upon threads. The method of washing the ginseng consists in placing the roots in a stout barrel, arranged horizontally, and which contains several rods extending from end to end. The barrel is about half filled with water, and rotated rapidly for several minutes, which loosens the dirt, so that upon a repetition of the operation the roots are thoroughly cleaned. They are then placed upon light canvas, stretched over wooden frames, and placed in a sunny place to dry.—*Drug. Circ.*, March 1884, 33.

RANUNCULACEÆ.

Aconite Root—Important Constituents as Determined by Laborde and Duquesnel.—See *Aconitine*, under "Organic Chemistry."

Coptis Trifolia—*Alkaloids*.—Mr. John J. Schulz has made experiments to determine the character and proportion of alkaloids contained in *Coptis trifolia*. His experiments show that the plant yields to officinal alcohol, slightly acidulated with acetic acid, 10 per cent. of its weight of extractive matter. That it contains two alkaloids, as previously shown by the investigations of Mr. E. Z. Gross (see Proceedings 1873, 232). That the berberine of *Coptis trifolia* is only partially separated by the processes usually employed for the determination of berberine. That it contains of berberine an amount equivalent to 0.8 per cent. of sulphate of berberine, or 57 grains of sulphate of berberine to the avoirdupois pound. That the amount of the second alkaloid is very small, 0.012 per cent., or only 0.855 grain to the avoirdupois pound having been obtained.—Amer. Jour. Phar., May 1884, 261-263.

Coptis Trifolia—*Presence of Starch in the Roots*.—Mr. Charles W. Burr has detected starch in the roots of *Coptis trifolia*. In *Coptis Teeta*, Wallich, found in the Mishmi Mountains, eastward of Assam, and recognized by Flückiger and Hanbury as the officinal *coptis*, starch is known to be present; though in 1873 Mr. E. Z. Gross failed to detect it in our American *Coptis trifolia*. Mr. Burr has repeatedly verified his observation on authentic specimens.—Amer. Jour. Phar., March 1884, 31.

MENISPERMACEÆ.

Cocculus Indicus—*Isolation and Character of a New Proximate Principle*.—*Cocculin*, which see under "Organic Chemistry."

LINACEÆ.

Linseed—*Removal of "Acarus Farinæ."*—Mr. W. H. Symons has examined several samples of linseed, and whilst he found all very good as far as freedom from foreign seeds was concerned, they were invariably infested with "*acarus farinæ*." To stop the depredation all the dust should be sifted out, and with it most of the eggs of the mite. The linseed can then be placed in a tin with a sponge saturated with chloroform; all life is soon destroyed, and a few minutes' exposure to air suffices to remove the odor of chloroform.—Phar. Jour. and Trans. Jan. 19, 1884, 563.

STERCULIACEÆ.

Cacao—*Presence of Caffeine along with Theobromine*.—While engaged in the operation of preparing theobromine from cacao beans, Mr. Schmidt has observed the separation from the last mother liquor of a small quantity of acicular crystals, corresponding in appearance and behavior with caffeine, which was obtained pure by dissolving in cold benzol and recrystallizing the evaporation residue from hot water. The occurrence of a second crystalline alkaloid, "existing in larger quantities in some descriptions of cacao than in others, and in larger proportion in the husk

than in the kernel," had been previously recorded by Mr. Bell (Analysis and Adulterants of Foods, p. 85), who, however, only speaks of it as a "theine-like alkaloid," containing 25.48 per cent. of nitrogen (anhydrous caffeine contains 28.86, and with one molecule of water, 26.41 per cent.). Mr. Schmidt, however, found the alkaloid to be identical with caffeine, and the gold salts to correspond exactly in appearance and in composition. The two alkaloids may be separated by taking advantage of their different solubility in cold benzol.—Amer. Drug., Mar. 1884, 53, from Phar. Jour.; Arch d. Pharm. (3) xxi, 675.

African Kolas.—E. Heckel and F. Schagdenhauffen have communicated a lengthy memoir to the Union Scientifique des Pharmaciens de France, on "Some African Kolas," in their botanical, chemical and therapeutic aspects. A voluminous abstract of this memoir will be found in Amer. Jour. Pharm., Mar. 1884, 166-172, from Phar. Jour. and Trans., Jan. 26, 1884, 586.

Kola Nuts—Botanical and Microscopical Description.—Mr. H. Zohlenhofer has communicated a paper on a kola nut, which is specially interesting on account of the very excellent illustrations showing their botanical and microscopical structure.—See Arch. d. Pharm., May 1884, 344-347.

TERNSTRÆMIACEÆ.

Camellia Oleifera—Presence and Character of Saponin in the Seeds.—Mr. Hugh McCallum has subjected the seeds of this plant to chemical examination. When freed from the husk they yield about 44 per cent. of a somewhat viscid yellowish oil, odorless and having an unpleasant after-taste. It is practically insoluble in 84 per cent. alcohol. The Chinese obtain the oil by expression, and it is used chiefly as a hair-dressing and illuminant, being known under the name of "*Cha Yau*," or tea oil. The powdered residue of expression is used under the name of "*Cha-tsai-fau*," as a washing-powder, its detergent properties being due to saponin present in the seeds to the amount of 10 per cent. The saponin was separated from the powdered seeds, previously deprived of oil by extraction with ether, by repeated treatment with boiling 84 per cent. alcohol, concentrating the solution to a syrupy consistence, and gradually pouring it, with constant stirring, into absolute alcohol. The precipitate which had cohered to form a sticky mass, was redissolved in warm 84 per cent. alcohol, digested with animal charcoal, filtered and evaporated to dryness. Thus obtained it constitutes a friable, amorphous, nearly pure white powder, odorless when dry, but of peculiar somewhat disagreeable odor when dissolved in water. It is sternutatory, hygroscopic, and has a sweetish taste at first, resembling licorice, then bitter and disagreeable, causing a peculiar biting sensation in the throat. It is insoluble in ether, sparingly soluble in absolute alcohol, freely in 84 per cent. alcohol, and very soluble in water. Its aqueous solution has a distinct acid reaction

to litmus paper, and gives precipitates with barium hydrate and basic acetate of lead, but none with the normal acetate in the cold. Heated with dilute hydrochloric acid, sapogenin is precipitated and glucose remains in solution. It yields only 0.9 per cent. of ash, composed chiefly of calcium. *Phar. Jour. and Trans.*, July 14, 1883, 21.

GUTTIFERÆ.

Gamboge—Production in Ceylon.—A correspondent of the "Weekly Ceylon Observer" inquires why gamboge should not be collected in Ceylon. He points out that fifty years ago Dr. Pereira described the color of Ceylon gamboge as excellent, and its medicinal effect as precisely the same as that of Siam. Dr. Pereira speaks of two kinds, the *goraka* and the *kana* (Sinh. "eating") *goraka*, and says further that "there seems to be no difficulty in obtaining the gamboge in a pure state; and, if so, it might become an article of commerce from Ceylon." Although this was stated in 1832, Ceylon gamboge has not yet become an article of commerce. The correspondent adds that Pereira's statement that there are two kinds of *goraka* is a mistake. There are as many varieties as regards shape of leaf, color of flower and fruit, and shape, size and flavor of fruit, as there are of mangoes, plantains, and all other fruit. The varieties hardly deserve botanical distinctions. The coarse gamboge sold in the bazaars is not what is collected in Ceylon, but is imported from Southern India. What is collected in the island is never sold. It is used sometimes by the Buddhist priests to dye their robes, a mixture with sapan dye giving thus brownish yellow or yellowy brown, which distinguishes the robes of the Amarapura sect of priests. It is used also to color mats, for painting walking-sticks, spears and bones, doors and walls of temples, etc. The mangosteen (*Mangostana cambogia*) belongs to the same or similar family, and from the rind of the green fruit particularly, the gamboge flows abundantly on mere pressure. There are some of the Ceylon *gorakas* yielding fruit quite as delicious for eating as the mangosteen. The half-ripe rind of some of the Ceylon varieties is dried and sold in the bazaars for pickling fish with. It has a peculiar, sharp, acid flavor. There is a variety grown in the fruit gardens known as the *rata* (foreign) *goraka*. The fruit is quite yellow when ripe, and, like the mangosteen, round, with a smooth surface, but the rind is soft, not leathery or rough. The seeds of this kind are, like the mangosteen and *goraka*, covered with a pulp, not white, but yellow in color, and, though sweet, quite different in flavor from that of the mangosteen or *goraka*. The tree resembles the mangosteen, but is smaller in size. The leaves are as large, but of a darker green, and with a greater droop. Can this be the *Garcinia Hanburii* of Siam? It is not a favorite fruit. When ripening it is picked and pickled in vinegar, the seeds being removed and the fruit stuffed with other pickled fruit, etc., finely chopped. It

seems that the goraka was considered of such little value that immense numbers have been felled from private and crown lands, and supplied to the railway as fuel. Measures should be taken to stop this wasteful destruction. As regards the mode of collection, the writer thinks it is very doubtful if the stick gamboge is collected by bamboos being placed below incisions in the tree for the liquid to flow into. The liquid exudes very slowly, and dries too soon to flow. The peculiar marks in the stick gamboge are usually attributed to the inner formation of the bamboo in which it is collected, but he is inclined to think it is the result of the daily additions of the semi-dried liquid put in as soon as it is *scraped* off from the tree. The few natives who gather it do exactly as was described by Colonel and Mrs. Walker in 1839. A piece of bark from the trunk, about the size of the palm of the hand, is cut off, and the resin scraped off it next morning. By boiling the leaves, the rind of the green fruit, etc., a gamboge, inferior only as a coloring matter, is obtained; but with care, and using the scraped and clean bark only, gamboge as a dye-pigment ought to be obtained in this way too. The goraka tree is now scarce in the Central Province, owing to its destruction when the forests were felled for coffee. But countless numbers yet remain in the island along the western coast from north to south. It would, however, be difficult for Europeans to set about collecting the gamboge, as the trees are so scattered over the country. A group of five to ten trees together in a plot is rarely found. New Rem., Oct. 1883, 307, from Pharm. Jour., July 28th.

VITACEÆ.

Wines—Product of Decomposition During Distillation.—Mr. S. Kiticsan, having repeated Liebermann's experiments ("Ber." [15], 154, 438, 2554) on the distillation of wine, finds that the distillate contains ammonia and formic acid, and that the precipitate produced on addition of silver nitrate contains organic silver salts; Wartha's method ("Ber." [15], 437) for detecting sulphurous acid in wines is therefore untrustworthy. Old wines contain from 0.0057—0.034 per cent. of ammonia.—Amer. Jour. Phar., Feb. 1884, 122, from Jour. Chem. Soc., Oct. 1883; Ber., 16, 1189.

Red Wines—Solubility of Coloring Matter.—It was formerly supposed that the coloring matter of red wines was dissolved out of the grape skins by the alcohol developed during the musting. Nessler pointed out that temperature influenced the extraction of the coloring matter, and Reihlen, in his method of wine-making, has shown that no alcohol whatever is necessary. F. Gantler, in the "Berichte der deutschen chemischen Gesellschaft, July 23, 1883, now proves that the solution of the coloring matter of the skins of grapes is dependent upon the amount of tartaric acid present in the juice, and on the temperature at which the musting is carried out.—Am. Drug., Feb. 1884, 26, from Chem. and Drug.

CANELLACEÆ.

Canella Alba—*Proximate Analysis*.—Mr. John P. Frey has subjected the bark of *Canella alba* to proximate analysis, and states the result as follows: Volatile oil 1.28, resin 8.2, mannit 6 to 8, ash 8.9 per cent., starch in considerable quantity, bitter principle, albumen and cellulose. The

Volatile Oil was in two portions, one heavier and the other lighter than water; the former was .70 per cent. and the latter .58 per cent. Both oils have a very strong, fragrant, somewhat camphoraceous odor, and a pungent, aromatic taste, the heavy oil being stronger in taste and odor. The odor of the bark is due to these volatile oils. The specific gravity of the heavy oil is 1.012; it is reddish-brown, begins to boil at 200° F., and the temperature gradually rises to 420° F., when it remains constant. It congeals at 38° F. The light oil has the specific gravity .988, is of a light straw color, begins to boil at 185° F.; congealing point about 22° F. Both oils have a strong acid reaction. Nitric acid acts upon them violently, producing a red resinous mass which is insoluble in alcohol, ether and potassium hydrate. Sulphuric acid produces a deep blood-red color. Iodine dissolves in both oils slowly and quietly. Ferric chloride produces a deep blue color, showing the presence of eugenic acid or eugenol. By neutralizing the oils with potassium hydrate and distilling, the residue is a crystalline mass of potassium eugenate, from which, with sulphuric acid and distilling, eugenol is obtained as a colorless oily liquid, having a pleasant odor. The distillate of the oils with the excess of potassium hydrate contained two colorless oils, one heavier and the other lighter than water. The latter is neutral to litmus, and when treated with sulphuric acid turns to blood-red, but nitric acid and ferric chloride do not affect it. The heavy oil was in such small quantities that enough could not be obtained to ascertain its nature.

The *resin*, which was obtained by exhausting the drug with alcohol, evaporating and pouring the concentrated tincture into water, is of a pale yellowish color, destitute of odor and taste, soluble in ether and chloroform, slightly soluble in cold, more so in boiling solution of potassa; insoluble in turpentine or cold or hot water. Its solutions in chloroform and ether have a distinctly acid reaction.

The *bitter principle* is isolated with much difficulty; it is soluble in water and alcohol, and is not precipitated by triplumbic nor normal acetate. The bark is entirely free from tannin.

Water extracts 22 per cent., and alcohol 10 per cent. of the constituents of the bark. A tincture and fluid extract prepared some time ago remain perfectly clear. The *tincture* represents 10 per cent. of the drug with a menstruum of alcohol 3 parts, water 1 part. The *fluid extract* was made with alcohol, and every cubic centimeter represents a gram of the drug. A *solid extract* was also prepared by exhausting the drug with alcohol 95 parts and glycerin 5 parts.

The ash was analyzed with the following results :

Calcium carbouate	83.00	} Insoluble in water.	88.40
Magnesium carbonate	1.70		
Aluminum and ferric oxides	2.60		
Calcium phosphate	1.10		
Potassium chloride	1.30	} Soluble in water.	13.10
Sodium carbonate	4.50		
Sodium sulphate	1.30		
Sodium chloride	6.00		
	<hr/> 101.50		<hr/> 101.50

—Amer. Jour. Phar., Jan. 1884, 1-3.

EUPHORBIACEÆ.

India-Rubber—Collection in Brazil.—The following description of collecting India-rubber in Brazil is given in the “Dominica Dial:” “In the early morning, men and women come with baskets of clay cups on their backs, and little hatchets to gash the trees. Where the white milk drips down from the gash, they stick their cups on the trunk with daubs of clay, moulded so as to catch the whole flow. If the tree is a large one, four or five gashes may be cut in a circle around the trunk. On the next day other gashes are made below these, and so on until the runs reach the ground. By eleven o’clock the flow of milk has ceased. A gill or so is the utmost yield from each tree; a single gatherer may attend to one hundred and twenty trees. The juice, which looks precisely like milk, if left to itself congeals after awhile, and forms an inferior whitish gum. To make the black rubber of commerce, the milk must go through a peculiar process. Over a smouldering fire, fed with hard nuts of the *tucuma palm*, the collector places a kind of clay chimney, like a wide-mouthed bottomless jug; through this ‘boiav’ the thick smoke pours in a constant stream. Now he takes a wooden round-bladed paddle, washes it with the milk, and holds it over the smoke until the milk coagulates. Then another coat is added, and the milk now coagulates faster, the paddle, or mould, having become heated; and it may be necessary to continue the operation until the gatherings of two or three days have been consumed to cover the mould thick enough. Then the rubber is dull white, but in a short time it turns brown, and finally almost black. The mass is then cut from the paddle and is ready for sale.” Jour. and Trans., July 28, 1883, 70.

India Rubber and Gutta Percha—Cultivation in Ceylon.—From the Director of the Royal Botanical Gardens in Ceylon, it appears the cultivation of india rubber and gutta percha in the island bids fair to be successful. It is urged upon the Government to lose no time in establishing plantations in Ceylon, and those other British colonies in which

the trees will grow, which must in future become a valuable source of revenue, since the hitherto sources of supply are rapidly becoming exhausted.—Phar. Jour. and Trans., June 28, 1884, 1052–1053.

PAPAVERACEÆ.

Opium—Cultivation in Roumelia.—Great success has attended the cultivation of the poppy in Roumelia, details of which are supplied by H. M. Consul at Salonica. The first attempt was made about seventeen years ago by a Turkish farmer at Istip, who, having brought a handful of the seed from Asia Minor, was altogether successful in his experiment. Dating from the year 1866, a very large industry in opium has been inaugurated. The Roumelia preparation is extremely pure, containing about 11 per cent. of morphia, while that of Smyrna yields scarcely 9 per cent. Last year the production of opium from this province reached the respectable figure of about 135,000 lbs., besides an enormous amount of poppy-seed; most of the drug found its way to England, while most of the seed was exported to Germany and France.

The Turkish Government, in this respect alive to its own interests, remits the tithes on opium and poppy-seed for one year in the case of lands that are thus sown for the first time, and distributes full instructions on the process of cultivation, extraction and preparation. The seed is sown from September to March in districts where there is no hoar-frost in spring and autumn; but in places where there is hoar-frost, September and the spring are selected, after the chilly weather is passed. Clay soil and damp are fatal to success.

The ground is well manured, and after the opium crop has been removed, wheat sown in the same field will be abundantly productive.

The soil must be thoroughly broken up, hand-sown, and again perfectly disintegrated and mixed with the seed. As soon as the plants begin to appear they are carefully separated, to allow sufficient space for growth, and the soil is hoed and weeded. The pods are at first green in color, the hue being changed to yellow on maturity. Just before this color change takes place, a thin, watery, light-green film forms over the pods, which itself becomes firm. This is the time selected for the collection of the juice. An incision is made in the pod with a knife adapted to the purpose, beginning from the middle and going round the edges, leaving a space of about a finger's breadth. The white, milky, bitter-tasting fluid then exudes. Gradually acquiring more consistency, its color deepens, and in twenty-four hours it resembles coffee, and is thick as paste.

Scraping this off with a blunt knife, the paste is put into a poppy leaf until from twenty to thirty drachms have been collected, when the edges of the leaf are turned up to preserve the contents. The work of cutting commences early in the afternoon and continues until nightfall.

The laborers set to work on the following day, as not more than twenty-four hours must elapse between making the incisions and collection. Unripe pods must wait. Attention is paid to certain details, so that the exact season for collecting opium may not be missed.

The whole work must be performed in eight or ten days, and the pods must be cut precisely at the right time, or there will be no yield of opium. High wind and rain are equally to be avoided, for both either scatter or destroy the juice as fast as it exudes from the cut seams. After the crop has been gathered, the pods change to a rose color, when the plants are taken up by the roots, one by one, and collected in small bundles. These are bound with a young green withe, placed upright in the ground with the roots covered, and to remain for a few days until the seed contained in the pod becomes ripe and dry. Another method is to sever the pods from the stem, collect, dry and thresh. No part of the plant is wasted; from the pods reduced to ashes a fluid is extracted, used for bleaching purposes, and said to be effective. The oil is extracted from the seed, and the residue is given to buffaloes, cows, and black kine, to promote the yield of milk.—New Rem., Aug. 1883, 240–241, from the Chemist and Druggist.

Opium Assay—Inaccuracy of the Method of the Germ. Pharm.—Dr. Geissler draws attention to the unreliability of the method for the estimation of morphine in opium given in the new edition of the German Pharmacopœia. This method is the one devised by Prollius, and minutely described by Flückiger (see Proceedings 1880, 17c). After entering into the objections to the process in some detail, Dr. Geissler sums up his observations as follows:

The method of the German Pharmacopœia does not separate the morphine completely. The morphine separated is at least not always pure. The results are not uniform.

These objections may be urged against every method that has yet been proposed, but the process of the Germ. Pharm. leaves more in solution, and yields a less pure morphine. The author expresses his approval of Mylius's volumetric method (see Proceedings 1881, 198–199), but hopes soon to perfect a gravimetric method based upon the solubility of morphine in opium.—Phar. Jour. Trans., Feb. 16, 1884, 645–646, from Phar. Centralh., No. 16–19, 1883.

CRUCIFERÆ.

Cruciferae—Percentage of Mustard Oil in Seeds.—See *Volatile Oils* under “Organic Chemistry.”

Raphanus Raphanistrum (Hedge-Mustard).—Characters, etc., of the fixed oil, which see under “Organic Chemistry.”

VIOLACEÆ.

Viola tricolor, var. arvensis—*Presence of a Peculiar Coloring Matter*.—Mandelin found in this plant a new coloring matter, *violaquercitrin*. The plant is exhausted with warm alcohol, the alcohol distilled off, and the residue treated with warm distilled water. On agitating this dark brown solution with benzin, for the purpose of obtaining the salicylic acid which it was previously found to contain, a yellow crystalline mass is precipitated. After washing, the crystals are easily soluble in alkalies with a deep yellow color, and reprecipitated by acid. They are soluble in hot water, and crystallize again on cooling. Its composition is $C_{42}H_{42}O_{24}$. On being boiled with dilute mineral acids, it is split into quercetin, $C_{24}H_{18}O_{11}$, and a fermentable sugar, $C_6H_{12}O_6$. The acid filtrate contains a third product of decomposition, which may be obtained by agitation with chloroform, and is characterized by its beautiful fluorescence when in alkaline solution.—Amer. Jour. Phar., Sept. 1883, 470, from Phar. Zeit. Russl., 1883, p. 329–334.

FICOIDACEÆ.

Mesembrianthemum crystallinum—*Percentage of Potassium and Sodium*.—H. Mangon found in the dried leaves of the ice plant 43 per cent. of salts of potassium and sodium, and calculates that a hectare would be capable of yielding 863 kilos of potassium carbonate.—Amer. Jour. Phar., July 1883, 370, from Memorabilien.

HAMAMELIDACEÆ.

Hamamelis Virginica.—An excellent description of the botanical character of this plant, and a review of its medical uses, is given in Amer. Drug., Jan. 1884, 1–2. The paper is accompanied by illustrations of the different parts of the plant.

CACTACEÆ.

Opuntia Vulgaris—*Proximate Examination of the Fruit*.—Mr. Wm. W. Light describes the fruit of *Opuntia vulgaris*, and communicates the results of some experiments made to determine its proximate constituents:

The ripe fruit contains 68.2 per cent. of moisture. The ash amounted to 1.76 per cent. of the entire fresh fruit. It consists largely of silica, besides carbonates, chlorides, sulphates and phosphates, with potassium, sodium, aluminium, iron, magnesium and calcium. The seeds are about one-sixth the weight of the entire fruit. The pulp contains an abundance of mucilage, having an acid reaction, and containing a gum which is precipitated both by normal and basic acetate of lead, and by alcohol. The acid is due to both tartaric and citric acids. Besides these, it contains red coloring matter, glucose, and pectose compounds. The seeds contained 7.25 per cent. of fixed oil, which, as obtained by the author,

was amber-colored, sp. gr. 926, of slight disagreeable odor, insipid taste, insoluble in alcohol or chloroform, soluble in benzin and ether. Starch and albumen were also found in the fruit, but neither a glucoside nor an alkaloid could be detected. The gum, when dried, is insoluble in water or alcohol, but becomes soluble in presence of alkali.—Amer. Jour. Phar., Jan. 1884, 3-6.

CUCURBITACEÆ.

Luffa Ægyptiaca—*Proximate Examination of the Fruit*.—Mr. Reimhard J. Weber has subjected the fruit of this plant, known under the name of *vegetable sponge* or *wash rag*, to proximate examination. Besides a large amount of mucilaginous substance, the fruit contains a trace of tannin, a small quantity of yellow coloring matter, chlorophyll, and a slightly bitter extract. The seeds yield to benzol a brown fatty oil and a green mass. The fibrous portion, for which the fruit is chiefly valued, is prepared as follows: The fruit is cut longitudinally on one side, stripped of the epidermis, the seeds are then removed, and the net work of fibres is washed thoroughly to get rid of the mucilaginous substance and dried. It is then ready for use.—Amer. Jour. Phar., Jan. 1884, 6-7.

MYRTACEÆ.

Jambosa Root—*Composition and Properties of Crystalline Principle*.—Mr. A. W. Gerrard has isolated the crystalline principle from jambosa root (believed to be derived from *Myrtus Jambosa*, L. (*Jambosa vulgaris*, D. C.), a native of India and Otahaiti), which Dr. A. B. Lyons had previously isolated and described as neutral. Mr. Gerrard, who found the crystalline principle only in the bark of the root, proposes to name it Jambosin, and finds its extraction extremely easy. The process was as follows: The bark was separated from the root, finely powdered and percolated with ether; the ether on evaporation gave an abundant crop of crystals, which by washing with ether and again crystallizing from ether were obtained perfectly white.

Properties of Crystals.—They are white and tasteless, melting at 77° C., becoming solid at 60° C.; soluble in cold ether, alcohol, and chloroform, and in hot petroleum ether. They are insoluble in cold water, but soluble on boiling, separating in crystals on cooling. With strong sulphuric acid they yield a bright green color, soon passing to a deep reddish-brown. With strong nitric acid they react violently, giving off nitrous fumes and forming an orange-colored liquid, from which water precipitates a new compound. They gave none of the reactions of a glucoside, neither do they possess the character of weak resin acids.

Analysis.—Before combustion the crystals were submitted to fractional crystallization from various fluids; the various fractions proving of uniform composition, the product was assumed to be pure. By exposure to dehydrating agents it scarcely lost weight.

Four combustions for carbon and hydrogen were made, giving as the average 60.585 per cent. C, and 7.584 per cent. H. Nitrogen being present it was twice estimated by the absolute method, and after the various corrections gave 7.2 per cent. N, leaving a difference of 24.631 O. These figures allow the construction of the formula $C_{10}H_{11}NO_8$. Therapeutically the principle appears to be of little value, the activity of the root no doubt residing in an oleo-resin. Amer. Jour. Phar., April 1884, 210-212, from Pharm. Jour. and Trans., Mar. 1884.

Pomegranate Bark—Proximate Analysis.—Mr. Wm. F. Jungkunz found that the commercial bark, on drying in an air-bath, lost 10 per cent. of moisture; 10 troy ounces of it exhausted with benzin left a wax-like extract weighing 1 gram; it was free from alkaloid, yielded to alcohol a small quantity of greenish-yellow matter, and contained a little fat and wax.

A tincture made from 12 troy ounces of the bark with alcohol and concentrating, on standing deposited crystals of mannit. The percolate also contained a little resin, considerable tannin, but no gallic acid, and yielded a small quantity of a light amber-colored oily liquid, which was soluble in water, alcohol, chloroform and ether, and gave precipitates with ferrous sulphate, cupric sulphate, plumbic acetate, mercuric chloride, and with several group reagents for alkaloids.

For preparing a larger quantity of the alkaloid, 60 troy ounces of the ground drug were mixed with about an equal weight of milk of lime and percolated with water; the reddish-brown liquid was concentrated on a water-bath, exhausted with chloroform, and this solvent evaporated; 3.63 grams of impure alkaloid were thus obtained. It was dissolved in alcohol, the solution digested with animal charcoal and the filtrate evaporated; the color was scarcely changed, but considerable of the alkaloid had been lost.

The decoction of the bark contained pectin and mucilaginous compounds, and on incineration the bark yielded 19.61 per cent. of ash, of which 24.36 per cent. was soluble in water, the remainder dissolving in hydrochloric acid, leaving a small amount of silica behind. The ash consisted of chlorides, carbonates, phosphates, and sulphates of sodium, potassium, calcium, iron and aluminium. The alkaloid evidently exists in the form of a tannate in the bark. Amer. Jour. Phar., March 1884, 137.

Pomegranate Bark.—Preparation of an effective and pleasant mixture, which see under "Pharmacy," p. 83.

METASTOMACEÆ.

Sulamita Vitulus?—*A New Anti-neuralgic.*—Attention is being directed to a drug from Colombia, to which the foregoing is the alleged botanical name, though no genus of that name has yet been found in botanical

works of reference. The drug consists of the dried flowers of a plant which is said to grow abundantly on the eastern spurs of the Cordilleras, and is used as a remedy in neuralgic affections. The flowers are said to possess, in the fresh state, a delicate aroma of such intensity that a single fresh flower, laid among clothes, is sufficient to impart to them a permanent perfume. Distillation of the dried flowers did not give such favorable results as were expected, the yield in essential oil not exceeding one-half per cent., which may have been due to loss occurring during the long journey. The oil was heavier than water, and in its odor markedly resembled salicylate of methyl, which is the principal constituent of oil of wintergreen, and it also sinks in water. The flowers sent, however, came from a melastomaceous, and not an ericaceous plant.—New Rem., Aug. 1883, 241, from Drug. Zeit. and Pharm. Jour.

Concerning this new anti-neuralgic, a correspondent of "New Remedies" (Sept. 1883, 258), in Europe, largely engaged in the manufacture of essential oil, states that diligent inquiries have so far only succeeded in ascertaining that the plant meant is

Melastoma Ackermanni, the leaves of which are used in South America for the preparation of an essential oil.

ROSACEÆ.

Quillaya Bark.—Preparation and Character of *Saponin*, which see under "Organic Chemistry."

Geum Album—*Medicinal Uses*.—This plant is regarded by Dr. W. A. Spurgeon as a valuable anti-emetic, relieving gastric irritation and headache. He uses it in the form of a tincture, made with 8 troy ounces of the plant to the pint; the dose is a teaspoonful or more.—Amer. Jour. Phar., Aug. 1883, 422, from Virg. Med. Monthly.

LEGUMINOSÆ.

Jequirity—*Active Principle*.—Dr. E. Klein has recently investigated the bacillus of jequirity, and finds that the bacillus is, of itself, quite incapable of producing ophthalmia, and further, that the pus from a case of ophthalmia contained no trace of the bacillus. He found also that the infusion of jequirity could be rendered incapable of producing ophthalmia by boiling for a time, insufficient to destroy the bacilli, and that the bacilli, when cultivated in peptone solution or jequirity infusion previously sterilized by boiling for half an hour, possessed no power of producing ophthalmia. The active principle of the jequirity appears, therefore to resemble, to some extent, in its vital properties, the pepsin ferment, in that it is easily destroyed by heat. This statement is confirmed by Mr. Arthur Benson, who found that ophthalmia could be produced by the freshly powdered seeds, by the freshly-made infusion, by the infusion after bacilli had appeared in it, by the infusion six weeks' old,

swarming with various micro-organisms, and by the infusion after the bacilli had ceased all motion and had sunk to the bottom of the liquid apparently dead. He had examined, at all stages of the disease, the discharges and membranes from eyes affected with jequirity ophthalmia without ever seeing the typical bacillus. A one in ten thousand solution of corrosive sublimate prevented bacilli from forming, but did not destroy the power of the infusion to produce ophthalmia.—Pharm. Journ. from Brit. Med. Jour., 1884, 476 and 564.

The same question has been investigated by Dr. Neisser, who arrived at the same results; and also by Dr. C. J. Salomonsen and M. Dirckinck-Holmfeld, who not only coincide with the above-named observers, but they have succeeded, at least partly, in isolating the active principle.

They found that the active principle was insoluble in alcohol, chloroform, benzin and ether; that it was comparatively slightly soluble in water, but very soluble in glycerin.

They were unable to extract any alkaloid, and expected the presence of an amorphous ferment. To establish this point, the jequirity seeds having been ground up, the powder was treated with ten times its weight of pure glycerin, rubbed up well, and allowed to stand for twenty-four hours, filtered, and then precipitated with five times its volume of alcohol. This precipitate was again treated with the necessary means for purification, and the result, dissolved in both water and glycerin, gave the characteristic jequirity inflammation.

The smallness of the amount of the active principle necessary to produce the inflammation is very striking. The glycerin solution which corresponded to the one-hundred-thousandth part of a gramme [of the seed], developed the characteristic inflammation, but one-half of this quantity produced no effect.

The results may, therefore, be summed up as follows:

1. The jequirity inflammation is *not* the result of bacteria.
2. It is the result of an active principle in the seed, soluble in both water and glycerin, but insoluble in alcohol, chloroform, ether and benzin; and destroyed by a temperature between 65° and 70° C., if kept up for one hour.
3. The quantity of active principle contained in the 100000 gramme of jequirity seed develops a well-marked conjunctivitis. The poison, when injected hypodermically in mice or frogs, quickly kills.—Amer. Drug., June 1884, 103, from Weekly Med. Review, April 1884.

In further support of the view that the activity of jequirity is due to a peculiar proximate principle, a dialysate prepared from the seeds has been found to be quite effective in several cases in which it was tried in the Manhattan Eye and Ear Infirmary. The dialysate representing one part of the drug in two parts, was employed by diluting with five times its volume of water. Amer. Drug., June 1884, 105.

Jequirity—Source of Activity.—Further experiments undertaken by MM. Cornill and Berlioz with a view to determine the general action on the body of the microbes found in an infusion of jequirity, *Abrus precatorius*, have led them to the conclusion that these bacteria are the sole active principle in producing the medicinal effects of the seeds. The infusion deprived of the bacteria by filtration after M. Gautier's process, produced no pathological effects, while the subcutaneous injection of a solution of the crystallized principle, prepared by M. Chapoteau from the seeds, produced no appreciable effects. Amer. Drug., Feb. 1884, 32; from Comptes Rendus, xcvi., p. 679—Pharm. Jour. and Trans.

Jequirity—Caution in its Use.—After reporting a case of sloughing of the cornea after the use of jequirity, in the "Weekly Medical Review," February 23, 1884, Dr. S. Pollak formulates as follows:

1. Jequirity is by far the best remedy which has been hitherto used for trachoma and pannus.

2. It does all, and more speedily, that has ever been claimed for purulent inoculation, minus the repulsiveness of the last remedy.

3. The infusion of jequirity must be used only when perfectly fresh. After four or five days it swarms with bacteria, when the danger of their entering the tissue and causing a septic state is very great.

4. Sterilizing the infusion requires much care and labor, and may not always be practicable. It will doubtless retard the decomposition, but it will not prevent it entirely.

5. The full therapeutic utility of jequirity will only be attained when chemistry shall have succeeded in preparing an alkaloid of it, which will keep, and the strength of it is properly known. Amer. Jour. Phar., May 1884, 292, from Med. and Surg. Rep., March 22, 1884.

Balsam of Peru—Commercial Treatment.—When balsam of Peru arrives at Acajutla and La Libertad, the ports on the "balsam coasts," from which it is chiefly shipped, it is in a crude state, usually of a gray green to a dirty yellow color, and requires to be submitted to a process of purification before it is fit for exportation. Concerning this process a correspondent of Messrs. Gehe & Co., furnishes some interesting information. He states that a first clarification is effected by allowing the crude balsam to stand in a large iron vessel capable of holding six or seven hundred pounds during a week or a fortnight, by which time the heavier impurities sink to the bottom, and the lighter ones float as a scum on the surface. The clear balsam, which has already attained its characteristic black-brown color, is then drawn off through a tap fixed about four inches from the bottom of the vessel and run into a tinned iron boiler set over an open fire and boiled moderately for two or three hours. All scum is removed as it makes its appearance, and the boiling is continued as long as any continues to be formed. It can easily be understood that the physical properties of the balsam will differ according to

the temperature to which it is submitted during this boiling, and it is alleged that the lower specific gravity observed in balsam of Peru during recent years is attributable to a modification it undergoes in this operation, and is quite consistent with the genuineness of a given sample.—*Amer. Drug.*, June 1884, 105, from *Pharm. Jour.*

Copaiba—New Test for Purity.—Dr. Joseph Barber recommends the following method based upon the optical behaviour of copaiba, to ascertain its genuineness. It depends upon the fact that the refractive power of balsam of copaiba is precisely identical with that of the starch-granules of *Canna edulis*, a species of arrow root ("tous les mois"), produced in the West Indies and Australia, of a slightly yellowish tint. If a drop of the balsam of copaiba to be examined be placed upon an object-glass, and a few granules be placed in it, the latter will remain invisible when viewed through the microscope, if the copaiba is pure. But if it is mixed with fixed oils or other foreign substances, the granules will become visible on account of their difference in refracting light.—*New Rem.*, Sept. 1883, 278, from *Pharm. Post.*

Lagam Balsam—Characters, etc.—This substance, also known under the name of

Minjak-Lagam-Balsam, was, according to De Vrij, first introduced into Rotterdam in 1854, from Padang in Sumatra. The plant from which it is derived is unknown; it appears that the oleo-resin, which closely resembles copaiba in appearance, varies somewhat in its properties. A sample of lagam balsam has been examined by G. Haussner, who found it to be a thick liquid of a peculiar aromatic odor and a bitterish, lastingly acrid taste. In reflected light it was of a dingy green, in transmitted light yellowish and transparent; its solutions were likewise fluorescent. It was readily and completely soluble in alcohol, ether, benzol, chloroform, and carbon disulphide. Mixed with strong sulphuric acid, sulphurous acid was given off and the color changed to purplish red, brown and black. On distillation with water about 33 per cent of volatile oil was obtained, which on rectification in carbonic acid gas, boiled between 249° and 251° , was colorless, levogyre 9.9° , and possessed a not disagreeable aromatic odor and burning taste; on oxidation it became yellow. From the ultimate analysis and the density of its vapor, its composition was determined to be $C_{20}H_{32}$. A crystalline compound of the formula $C_{20}H_{32}HCl$ was obtained on treating the oil with dry hydrochloric acid gas.

The resin was inodorous, hard, yellow, soluble in alcohol and ether. A portion of it is soluble in potassa solution and yields a copper salt having the formula $C_7H_{11}O_2Cu$. The portion insoluble in alkali was treated with melted potassium hydrate, when butyric, acetic, and formic acids were obtained; also phenols or aromatic acids which could not be determined for want of material.

Minjak-lagam-balsam evidently shows considerable analogy to both copaiba and gurjun balsam, and differs from the latter mainly by the resin-acid, which could not be crystallized.—Amer. Jour. Phar., July 1883, 368-369, from Archiv d. Phar., vol. 221.

Glycyrrhiza Glabra—*Microscopic Examination*.—Mr. Thomas Ridgway Barker, in examining the ordinary liquorice root (*Glycyrrhiza glabra*), finds imbedded in parenchyma and in wood, bundles of bast fibres. These bundles have what may be called a bundle-sheath, in which are found crystals of calcium oxalate, shown to be such by the ordinary tests.

Figure 44 shows the bundle in the parenchyma, seen in cross section. Figure 45 gives a longitudinal view of the same, divested of its surround-

FIG. 44.

FIG. 45.

Glycyrrhiza, transverse section of bast bundle,
magnified 350 diam.

Glycyrrhiza, longitudinal
section of bast
bundle, magnified 350
diam.

ing parenchyma. Figures are magnified about 350 diameters.

Such crystals and crystal sheaths are not unique. They are found in the *Aspidosperma Quebracho*, for which see the essay by Dr. Adolph Hansen, reprinted in the "Therapeutic Gazette," October 1880, p. 292, and are also found in the stem of the anomalous *Welwitschia mirabilis*, for a figure of which see "De Bary Vergleichende Anatomie," p. 140. There is, however, this difference between the liquorice root and the other plants, *i. e.*, in the former several fibres are included in a single crystal sheath, while in the *quebracho* and *welwitschia* there is but a single fibre.

Logwood—*Test for Metals*.—Mr. Arthur Weddell has for some years

examined potable water for metallic impurities by means of the alteration products produced in the coloring matter of logwood. When logwood is digested with alcohol an extract of a rich yellow color results, and this color is not changed on dilution with a pure, freshly distilled water. When added to ordinary samples of water, which contain calcium carbonate in solution, the yellow color is changed to a beautiful rose red, or, if a metal be present, to blue.

These changes are accounted for in the following manner: Hæmatoxylin, the ordinary coloring matter of logwood, is converted by oxygen, especially in the presence of alkalies, into an oxidized product known as hæmatëin, which gives a blue precipitate with salts of iron, lead, copper and many other metals, or if the solution be extremely dilute, a blue coloration only. This reaction is so delicate that 1 part of lead in 100,000 parts of water is easily detected, and with care 1 part in 200,000.

These changes do not occur in acid solutions. The method of using the test is extremely simple, and consists in the addition of a few drops of a very dilute tincture of logwood to the sample under examination, care being taken that the quantity added is not too great, as a trace of metal may be thus overlooked, owing to the difficulty of observing the change of color in presence of a large excess of red coloring matter.

The author's practice is to prepare an alcohol extract of logwood (strength 1 in 100) by maceration and to note how much of this is required to produce a distinct rose color in 100 cc. of distilled water rendered faintly alkaline with ammonium carbonate, or in 100 cc. of hard water free from metals.

This quantity of logwood solution is next added to 100 cc. of the water under examination, and the two tubes are compared. If a rose color is developed, metals are absent, while a blue color indicates their presence.

More logwood may afterwards be added to each tube and the progressive differences noted, the blue color increasing in depth, or to a precipitate if much lead be present.

The presence of free acids interferes with the reaction, and these, if present, must therefore be carefully neutralized and a slight excess of alkali added. Free carbonic acid gas should be removed by boiling.—*Amer. Jour. Phar.*, April 1884, 214-215; *Phar. Jour. Trans.*, March 8, 1884, 717.

Piscidia Erythrina—*Isolation and Character of Active Principle*.—Mr. Edward Hart has isolated the active principle of Jamaica dogwood as follows: A pound of the fluid extract was well mixed with 30 grams of quicklime, previously made into a thick paste with water; after digesting for half an hour the liquid was filtered, and water was added to the filtrate until it became slightly turbid; after two or three days crystals

of the principle, for which the name *piscidin* is proposed, separated accompanied with resinous substance. By adding more water a second crop of crystals still more impure can be separated. The crystals are purified by recrystallization from alcohol. The resinous matter precipitated by water retains a small portion of piscidin, of which the author thinks a pound of the fluid-extract contains about one grain.

Elementary analysis led to the formula $C_{22}H_{24}O_4$. Piscidin crystallizes in nearly colorless prisms, melts at $192^{\circ}C.$, is insoluble in water, slightly soluble in cold, much more in boiling alcohol, slightly soluble in ether,

FIG. 46.

FIG. 47.

Cascara Amarga Bark.

Cascara Amarga,
cross section
magnified 5
times.

easily soluble in benzene and chloroform. It dissolves in cold concentrated hydrochloric acid, and is reprecipitated apparently unchanged by dilution with water. It dissolves in cold sulphuric acid, and separates again by addition of water, but it dissolves no longer easily in alcohol. Boiling with acids causes no separation of sugar. The alcoholic solution is neutral to test-paper, and not precipitated by acetate of lead. Amer. Jour. Phar., July 1883, 369; from Amer. Chem. Jour., 1883, 39.

Phaseolus Vulgaris.—Occurrence of a New Alkaloid, *Phaseolin*, which see under "Organic Chemistry."

TEREBINTHACEÆ.

Cascara Amarga—*Microscopic and Chemical Examination of the Bark.*
Mr. F. A. Thompson gives the following description of a microscopic examination of *Cascara amarga*, also known as "Honduras Bark" (See Figs. 46, 47 and 48):

FIG. 48.

The outer or cork bark (*a*) is composed of twenty-five or thirty rows of regular thick-walled cells, filled with red coloring matter. The middle bark is composed of large irregular parenchyma cells (*d*) making up the greater share of the whole bark. Throughout this portion of the bark are numerous sclerenchyma yells (*b*) arranged in groups, and also one to three rows are always found close to the outer bark. These sclerenchyma cells make a prominent marking, as seen with the naked eye in cross-section Fig. 47. Also at intervals, are one to three ranked series of sclerenchymatous fibres or bast-fibres (*c*) arranged tangentially, which turn brown after treatment with iodine. The inner bark does not differ very much from the middle except it is divided by several rows of medullary rays (*e*) composed of regular cells.

The bark as seen in commerce is mostly deprived of its outer bark, which is from one to three millimeters thick, of a brownish-gray color, striated, and much divided by numerous longitudinal fissures. After being immersed in water, it assumes a greenish-yellow tint. The inner bark is of a deep-brown color, three or four millimeters thick, hard, and firm, of a bitter taste, and on examination of a transverse section numerous white spots are to be seen, which appear to be filled with a white insoluble inert substance.

The author also communicates the results of a proximate analysis of the bark. Among other substances, which appear to be of no importance, he has isolated an alkaloidal principle, for which he proposes the name

Picramnine, the exact nature of which he proposes to make the subject of future study. It seems to have the peculiar taste found in the bark on chewing a portion, and the author suggests that the virtues of the drug reside partly, if not entirely, in the new principle. To determine this point, physiological experiments are being instituted with the alkaloid.—*Amer. Jour. Phar.*, June 1884, 330-334, from *Ther. Gazette*, Jan. 1884.

RHAMNACEÆ.

Ceanothus Americanus, L.—*Proximate Analysis of the Leaves*.—Mr. J. H. M. Clinch found the air-dry leaves to lose 10.9% of moisture on drying, and to yield 5.31% of ash, of which 50.526% was soluble in water; 48.629% was soluble in hydrochloric acid, and 0.8% was soluble in boiling sodic hydrate. The powdered air-dry leaves yielded to pure benzol 5.64%, then to stronger alcohol 21.72%, and then to cold water 12.795% of their substance. No definite substance of any importance seems to have been determined by the author.—*Amer. Jour. Phar.*, March 1884, 131-133.

AQUIFOLIACEÆ.

Mate or Paraguay Tea—History, Character, and Composition.—A

very comprehensive paper on this drug is contributed by Dr. Theodore Peckolt, from which the following is abstracted:

This plant, which belongs to the holly family (Ilicineæ), has several names in different parts of South America. In the Guarani language it is *Caá*, which is the Indian word for leaf. The prepared leaves were named by the Spanish "yerba" (herb), and the infusion "mate" from the native name for the vessel in which the tea is made, and the drug is now generally known as mate in Brazilian commerce, although the Spaniards call it "yerva mate" or "yerva de palos." The name "congonha" has been said by some writers to be applied to mate, but this is an error, for the Brazilians understand by the names "congonha mansa" and "congonha brava," other trees belonging to the same natural order, which are used as a substitute for mate when it is not easily procurable.

After giving the botanical description and habitat of the plant, its uses, etc., the author enumerates the species of *Ilex* that have been employed for the preparation of mate. The investigations made by Miers and the monk Leandro, Director of the Botanical Gardens in Rio Janeiro, confirmed by Bonpland, indicate that six different species are used for the purpose: 1. *Ilex theezans*, Bonpl., growing in Paraguay, Entre Rios and Brazil; 2. *Ilex ovalifolia*, growing in the neighborhood of Rio Pardo; 3. *Ilex amara*, Bonpl., on the mountains of Santa Cruz, and in the forests of the Brazilian province of Parana; 4. *Ilex crepitans*, Bonpl., in the interior of Santa Cruz and the banks of the Parana river; 5. *Ilex gigantea*, Bonpl., on the banks of the Parana river. This is the "caá-una" of the Guaranis. 6. *Ilex Humboldtiana*, Bonpl., in the province of Rio Grande do Sul. This is the "caá-unina" of the Brazilians. The last four species, more especially *I. amara*, yield the "caá-chira" of the Guaranis and the "caá-una" of the Brazilians. Martius, however, in the "Flora of Brazil," states that in the central districts of Paraguay, where the *I. paraguariensis* is especially abundant, only the leaves of this species are used; in other districts the various species of *Ilex* are similarly employed.

It is certain, however, that *I. paraguariensis* is the only species in cultivation, but this is carried on to a very limited extent, as the wild plant is still abundant. The Jesuits planted the tree because they found that under cultivation the leaves had a milder and more pleasant taste. For cultivation the seeds are carefully freed by washing from the glutinous matter in which they are imbedded, without which treatment they would not germinate, this office being probably performed in a natural state by birds, since the Indians believe that the seed will not germinate unless they have been voided by birds. The young plants are taken out of the hotbed when about 6 inches high and planted out about 12 to 15 feet apart, in a damp, somewhat marshy ground, so as to allow of a small

trench being made around the plants, in which water can collect. They must also be grown under the trees which afford shade, as the young plants are easily killed by a strong sun. When they are about 3 to 6 feet high some of the shade plants are removed, and in four years the leaf harvest can be begun. The young trees should not, however, be entirely deprived of their leaves, lest they should not be able to recover. In the seventh year they will yield 30 to 40 kilos of leaves. It is calculated that on 220 square metres of land one thousand six hundred trees can be grown, yielding on an average 25 kilos of leaves per tree, or about 25,454 kilos of leaves, valued at 190,000 marks per 100 square metres. The cultivated plant remains a small bush and never reaches the stature or size of the wild tree. The cultivation of mate has been carried out with much success in the province of Parana by Dr. E. Westphalen, and it promises to be successful in the Dutch colony of S. Leopoldo in the province of Rio Grande do Sul, where the plant grows luxuriantly.

The tree has been planted in the Cape of Good Hope and seems to succeed well there, as well as in Spain and Portugal. The quality of Paraguay tea depends upon the time of year in which it is collected, the leaves possessing most aroma when the fruit is nearly ripe. In the Argentine Republic and in the Brazilian province of Rio Grande do Sul the leaves are collected from February to the end of July. The new shoots are put forth in August, but at that time it would ruin the trees to gather the leaves. In the forest of the Brazilian province of Parana and Santa Catherina, the harvest is collected from March to the end of September. In Paraguay it begins in December and continues till August. About a month beforehand the collectors set out in caravans with their wives and children into the forests where the mate trees are abundant, and make their encampment.

The first operation is to prepare a torrefier, which is made in the shape of an arbor. The twigs are cut off from the branches and slightly scorched by drawing them quickly across the fire. The twigs are then collected into bundles suspended over the torrefier, a small fire of dried wood being kept alight beneath. In about two days the drying is completed, the ashes are removed, and in the spot where the fire was an ox-hide is spread out, on which the leaves are beaten from the twigs with a wooden blade. The dried leaves are then powdered, and packed in wooden cases made out of hollowed trunks of trees.

In the province of Parana the leaves have lately been dried in large wrought-iron pans, in the same manner as Chinese tea, or in specially constructed ovens, in which they can be prepared so as to retain more aroma; they are then powdered by machinery and sifted; this kind of mate obtains a better price.

Another form in which the leaves are prepared is by carefully separating them from the stalks and twigs, and roasting them; but this is not so

much esteemed as the powder, except in Chili, where the leaves are preferred.

In the South American Republic, and the Brazilian province of Rio Grande do Sul, mate is packed in serons of ox-hide holding 30 kilograms, and in half-serons, containing 15 kilograms; this packing gives to the mate a disagreeable flavor which detracts from its value.

In Parana, it is packed in cane baskets; these are lined with dried grass called Jacaes, and contain 50 to 60 kilograms. The mate in leaves is here sold at 280 to 290 reis (about 56 pence); powdered mate is sold in thick and better-woven cane baskets, containing in a half-seron, 15, and as a seron, 60 kilograms, the price being 10 to 12 per cent. more than the leaves.

In the Spanish Republic three different sorts are sold under the following names :

1st. Caá cuy, or Caá-cuys. These are the new leaves of the scarcely developed shoots. They are of more delicate texture, and of a yellowish color. They possess an agreeable and pleasant flavor, but are seldom met with in commerce.

2d. Caá-mirim. This was the chief product in the time of the Jesuits, and consists of the leaves carefully separated from the twigs and stalks, the midrib of the leaf being also removed. This kind is chiefly esteemed in Peru, and principally exported there by the Brazilians. It is called Herva mansa.

3d. Caá-guacu, or Caá-una, or Yerva de Palos, is the most inferior kind, consisting of the large and old leaves with the twigs and fragments of wood, and possessing a strong and bitter flavor.

In Rio Janeiro two sorts are known to commerce, mate in leaf and mate in powder. In order to test the quality of mate, the merchant takes a small quantity in his hand and blows upon it. If the greater portion is blown away, he considers that it has been heated too much, and thus deprived of its strength. If it is not easily blown away, it is then considered of good quality.

Dr. Peckolt, some years ago, analyzed mate and congonha leaves. The analyses were made with fresh leaves of the *Ilex paraguariensis* from the Orgel Mountains in Neufreiburg, and roasted and unroasted leaves from the province of Parana.

The following constituents were found in 1000 grams of the air-dried substances.

	Little twigs from Neufrei- burg.	Leaves from		Mate from Parana.
		Orgel Mountains.	Parana.	
Stearoptene . . . . .	. . .	0.021	0.019	
Volatile oil, extracted by ether . .	. . .	0.099	0.179	5.550
Fat and waxy substance . . . . .	. . .	19.800	18.800	
Green coloring matter . . . . .	. . .	10.900	10.800	
Chlorophyll and soft resin	9.400	20.966	51.200	6.102
Brown acid resin	19.700	48.500	84.500	25.500
Caffeine	2.579	6.398	16.750	5.550
Aromatic substance . . . . .	. . .	. . .	2.500	
Bitter extractive	30.000	{ 2.038		
Mate-tannic acid, pure }		{ 27.472	44.975	16.785
Pyromate-tannic acid . . . . .	. . .	. . .	. . .	1.465
Mate-viridic acid, crystallized . .	. . .	0.024	0.025	0.024
Sugar, saccharine extractive . . .	. . .	39.266	6.720	1.370
Albumen, salts, dextrin, etc . . .	. . .	47.666	36.102	18.189
Extractive matter	938.321	{ 8.815	65.130	16.610
Moisture		{ 166.660	104.600	} 908.379
Cellulose and loss		{ 601.386	557.700	

The ash of mate analyzed by Dr. Busse and Mr. Riemann was found to contain potassium, sodium, magnesium, manganese, calcium, aluminium, iron, phosphoric acid, sulphuric acid, carbonic acid, chlorine, silicic acid ; but the analyses vary so much in different samples as to lose some of their value. Dr. Peckolt found in leaves of mate gathered in Neufreiburg oxide of manganese, 8.958 ; sodium, 10.062 ; and potassium, 14.615 per cent., whereas these were not found at all by the above-mentioned analysis in leaves obtained from Rio.—Amer. Jour. Phar., Nov. 1883, 570-577, from Zeitschr. Oesterr. Apoth. Verein in Phar. Jour. and Trans., August 18, 1883, pp. 121-124.

EUPHORBIACEÆ.

Castor Oil Plant—Cultivation in India, etc.—Mr. T. N. Muckarji has drawn up a note on Castor seed, giving the particulars of the method of cultivating the Castor-oil plant and preparing the oil. The plant may be grown on almost any kind of soil, although it loves a sandy loam, and will not grow well on clays. It does not require any special care, besides the ordinary ploughing and manuring bestowed on cereal crops. In upper India, it is sown in March or April, two or three months before the rains, and in July at the beginning of the rainy season. The fruit of the first sowing ripens in November and continues to yield seed till March ; that of the second sowing ripens in May. The plants, which grow eight or ten feet high, are cut down after having borne for one year, as the second year's produce is inferior in quality and less in quantity. The seed is soaked, for twelve hours, in water, and is then sown by hand, one yard apart. Twelve pounds of seed are required for an acre. The crop needs no further care, except watering, if the weather is too dry. The

fruits are plucked by hand before fully ripe, and exposed to the sun ; when dry, the seeds are separated from the outer shell.

The oil, roughly prepared by the natives, is very impure, thick, and viscid, and smokes offensively when burnt in lamps. It is also used to anoint shoes, water-bags used for raising water from wells, and other agricultural appliances made of leather. (It is said that rats will not attack leather so treated.) The makers for export sell four qualities: No. 1, cold-drawn ; Nos. 2, 3, and 4, coal-drawn.

Messrs. Khettra, Mohan & Bysacks, of Calcutta, have supplied details of the processes they employ. For the cold-drawn, the seeds are cleaned by hand by women. A quantity of the seeds are placed on a board, and are struck once or twice with a mallet, which breaks the seeds into two or three pieces ; they are then winnowed, dried in the sun, broken by a crushing machine, placed in small canvas-bags, and pressed in a hand-machine. The oil is bleached by exposure to the sun in large, open galvanized iron vats. This also causes the sediments to precipitate. It is then boiled, to remove the last traces of moisture. Vegetable charcoal is then added, and the oil is thrice filtered through flannel or blotting-paper.

The other grades differ in that heat is employed during the pressing, and that they are not filtered. In fact, less care is exercised in their manufacture.—Amer. Drugg., April 1884, 66, 67.

Croton Oil—Purgative Principle.—In a former paper (see Proceedings, 1878, 501), Mr. Harold Senier had pointed out that English pressed croton oil of admitted genuineness could be separated by alcohol into two parts, and that the part soluble in alcohol contained the vesicating principle, while the part soluble in alcohol was entirely non-vesicating. He at that time was inclined to the belief, in common with the experiments, that the purgative action of croton oil was due to the vesicating principle ; but experiments since made have shown that the purgative constituent does not exist in the alcohol-soluble vesicating oil, but is entirely in the alcohol non-soluble, non-vesicating oil. The latter was prepared by washing with alcohol until all traces of vesicating oil were removed. It was administered in doses $\frac{1}{8}$ to $\frac{1}{2}$ minim (corresponding to $\frac{1}{4}$ to 1 minim of commercial croton oil) in form of pills, using carbonate of magnesium and extract of hyoscyamus as excipients. The general results were, from the smaller doses a mild, and from the larger doses a powerful purgative effect, unaccompanied by any unpleasant symptoms. On the other hand, the administration of the vesicating oil under similar conditions produces no purgative action, but a considerable amount of irritation in the alimentary canal, accompanied by nausea. Mr. Senier's observations are confirmed by physiological experiments made by Dr. I. W. Meek. The author expresses the opinion that this non-vesicating portion of croton oil will furnish a useful, safe, speedy, and pleasant purgative.—Phar. Jour. Trans., Dec. 1883 ; Amer. Jour. Phar., Jan. 1884, 22, 23.

Mr. R. H. Smiley has repeated the experiments of Mr. Harold Senier, both as to the separation and action when separated, of the vesicating and purgative principle of croton oil, and his results completely confirm those of Mr. Senier. The author observes that croton oil will, in the future, be more useful as a remedy than it has been in the past, especially as to internal administration, which has heretofore been accompanied with very unpleasant effects, on account of the vesicant principle. But this evil being now removed, the good results of the purgative principle are ready for investigation.—St. Louis Drugg., April 26, 1884.

Croton Oil—Vesicating Principle.—In continuation of his experiments on the vesicating constituents of croton oil (referred to in the above), Mr. Senier proves that the vesicating activity is not due to the free acids, nor to any basic constituent, but that it resides in the combined non-volatile fatty acids. These have been separated to a considerable extent, if not to complete isolation, but the further elucidation and study is reserved by the author for a future communication. It seems highly probable that the new fatty acid belongs to the group to which belongs oleic acid and its analogous ricinoleic and linoleic acids.—Pharm. Jour. Trans., Dec. 8, 1883, Amer. Jour. Phar., Jan. 1884, 23-27.

Crotonol—Preparation, etc.—G. Guérin reports that he has for some time past prepared very active blisters from croton oil for the service of Prof. Mayet in the hospital at Antiquaille.

The vesicating portion of croton oil, the so-called crotonol, is easily extracted from the oil by shaking together, in a bottle, equal parts of croton oil and alcohol of ninety per cent., and setting aside until two layers are formed. The alcoholic layer contains the crotonol. This is separated and exposed in a capsule until the alcohol has evaporated.

The resulting residue is somewhat more viscid than the original oil, and very highly active.

To prepare blisters, pieces of silk of suitable size are cut, and fastened by the hand upon diachylon plaster, and enough crotonol is applied to the silk to thoroughly saturate it.

The results are reported to have been “absolutely satisfactory.”—Amer. Drug., March 1884, 52, from Bull. de Pharm. de Lyon.

Tapioca—Process of Manufacture in Malacca.—Mr. James Collins has witnessed the whole process relating to tapioca, from the fresh root to the finished product, as packed for market. Arriving at the manufactory, there were driving bands above the visitors' heads, streams of water flowing in every direction, glowing fires, and a hive of very scantily-clad Chinese. Drove of these coolies came from the fields, with baskets slung on poles, filled with fresh root-stocks. These were washed in tubs in a constant stream of water, and then peeled like turnips. Next, they were sliced in one machine and pulped in another. The pulp was removed in cane baskets to strainers, large wooden frames, with calico

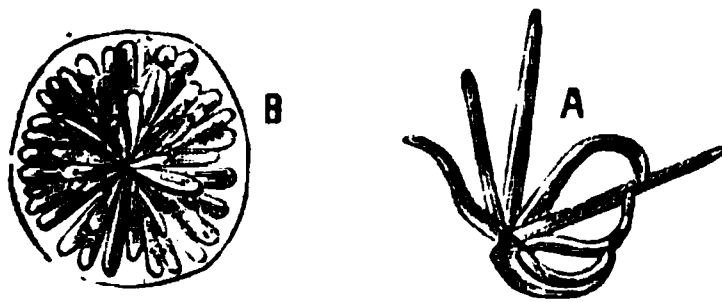
bottoms. Above these, tanks giving off a powerful stream of water impinged upon the pulp, a sifting motion being communicated to the strainer. As the starch became washed out, it was received into inclined troughs, and, whilst in a state of suspension, run into settling-vats. There it was stirred and washed, and, while moist, it was removed to the drying-room.

Two kinds of tapioca are prepared. The flour is made by heating slightly by fires placed underneath; it is constantly stirred, and turned over with iron shovels, to prevent agglutination, and insure equal drying.

Granular tapioca is made as follows: A long range of quallies, or small iron shallow pans, are slightly tilted forward on ledges of brickwork, and heated with a wood fire. Each operator has a quallie and fire to himself. Taking a quantity of damp starch, he stirs it round and round with an iron shovel, and the heat is sufficient to cause the tapioca to become agglutinated together in small masses, and coated with dextrin. This was done with great skill, and with an open fire. On further inquiry, Mr. Collins found that wooden stirrers were never used but from motives of economy, when iron could not be afforded. The late Dr. Seeman had expressed the opinion that the peculiar lumpy form of tapioca was due to the action of a peculiar kind of wood used in the preparation of the starch.—Amer. Drug., June 1884, 105, from Chem. and Drug.

Kamala—Microscopic Character of Several Varieties.—Mr. Wm. Kirkby gives an interesting description of the several varieties of kamala, which, apart from its use as a medicine, is used very extensively as a dye, being variously known under the name of *wurru*, *waras*, or *wurs*. The kamala as found in commerce, is a fine, mobile powder, of a dull red color. Under the microscope it is seen to consist chiefly of translucent, bright red granules, mixed with colorless stellate hairs (Fig. 49 *a*.) These hairs give the drug its dull appearance. The glands (Fig. 49 *b*) are

FIG. 49.

Kamala : *a*, gland ; *b*, stellate hairs.

spherical, rather irregularly so. Their diameter is from 70 to 120 micromillimeters. They are flattened on one side, and are composed of a number of clavate cells enclosed in a pale yellow membrane. The cells are arranged in a radiate manner round a short stalk cell, which is not always visible, occupying the basal side of the gland. From ten to thirty of these cells may be seen on one side; the whole cell, however, contains from twenty to sixty of them. The cells are filled with a red

resin, which is soluble in solution of caustic potash, in alcohol, and in ether. On treatment with caustic potash the structure of the gland becomes plainly visible. On appropriate treatment, the cells are seen to be composed of cellulose, while the enclosing membrane is seen not to be cellulose.

Several years ago, Messrs. Allen and Hanbury imported a remarkable kind of this drug from Aden. This has been described fully in "Pharmacographia," and has been subjected to exhaustive examination by Professor Flückiger. It differs from the ordinary variety in bulk, in having a dark red or violet color. Microscopically examined, it is at once seen to have quite a different structure. Solution of caustic potash dissolves the resin contained in the glands, and the general structure is easily seen. The glands (Fig. 50, *a*) are cylindrical, somewhat conical, and are com-

FIG. 50.



FIG. 51.

Purple Kamala. *a*, *c*, glands;
b, single hair.

New Kamala. *a*, dry; *b*, seen in caustic
potash.

posed, like the other, of resin cells enclosed by a membrane. They are from 170 to 200 mkm. long, and from 70 to 100 mkm. broad. The hairs (Fig. 50 *b*) mixed with them are simple and long, when compared with the short stellate hairs of the common kind. Professor Flückiger is quite sure that the two kinds of kamala are not obtained from the same plant; and Dr. Dymock, in his "Vegetable Materia Medica of Western India," says: "*Wurs*, or *wurru*s, which differs from genuine kamala in being a dark purple color, is the gland of the leaf of a leguminous plant, *Flemingia congesta*."

A third variety of kamala, catalogued in the museum of the Pharmaceutical Society of Great Britain as "*Wurru*s, second quality," is totally different from either of the above two varieties. Mr. Kirkby has been unable to find any record of this drug, the microscopic characters of which are as follows: The glands are from 50 to 70 mkm. long, and from 50 to 100 mkm. broad. When seen with the microscope in the dry state (Fig. 51 *a*), they are translucent, and but faintly colored yellow. In form they vary very considerably, and there appears to be no prevailing form. They impart but little color to ether, alcohol, or solution of caustic potash. The cells are devoid of any such resin as is seen in the other two kinds. In solution of caustic potash they swell considerably (Fig.

51, δ), and their structure is rendered clearly visible. They consist of a mass of cells, composed of cellulose, enclosed by a non-cellulose membrane. The cells are not arranged in any particular manner. The hairs are similar to those found in the purple variety, being quite simple.—Phar. Jour. and Trans., May 10, 1884, 897–898.

Waras—*Source*.—Mr. W. T. Thiselton Dyer, referring to the above paper of Mr. Kirkby, states that authentic specimens of African and Arabian “waras” for the Kew Museum, have reached England from Aden. These specimens of “waras” agreed microscopically with an authentic specimen derived from Professor Flückiger, and had the structure figured by Mr. Kirby. All three exhibited the characteristic property of turning first bright red, then black when carefully heated in small quantity on a glass slip over the flame of a spirit lamp. The sample of Somali “waras” was mixed with seeds of a dull brown color, mottled with black. These were found to agree precisely with the seeds of *Flemingia rhodocarpa*, Bak., from the Mozambique, which, as mentioned in the “Kew Report” for 1880, p. 50, “has its pods covered with a bright red resinous pubescens.” A further scrutiny of the original specimens obtained by Captain Hunter (referred to in the “Kew Report,” from the neighborhood of Aden, which is in a rather immature state, led Professor Oliver to the conclusion that this belonged to *Flemingia rhodocarpa*. Mr. Dyer believes that the drug is derived from the young pods, and he is therefore disposed to think that Mr. Dymock is in error in describing it as “the gland of the leaf.”—Ibid., May 17, 1884, 917.

In a further note Mr. Dyer communicates an interesting memorandum by Major F. M. Hunter, on the subject of the “waras,” collected by him at Harrar in February and March 1884. It contains a complete history of the collection of the drug, and was accompanied by a further specimen in fruit of the plant producing it, the pods bearing the epidermal glands still undetached. There can now be no sort of doubt that the “waras” plant is really that described by Mr. J. G. Baker, F. R. S., in the “Flora of Tropical Africa,” as *Flemingia rhodocarpa*. It appears, however, that this plant is identical with a *Flemingia* apparently confined to South India, *F. Grahamiana*, and that Mr. Baker, in creating a new species, evidently and pardonably neglected the comparison of the material he was working upon with specimens of the species occurring in so remote and botanically widely severed an area as the southern part of the Indian Peninsula.—Ibid., May 31, 1884, 969.

URTICACEÆ.

Hops—*Preparation and Character of the Bitter Substance*.—See *Hop-Bitter-Acid* under “Organic Chemistry.”

MONIMIACEÆ.

Boldoa Fragrans—*Chemical Examination*.—Mr. H. W. Korper has subjected the leaves of *Boldoa fragrans* to proximate examination, and ascertained the following constituents :

- Boldina (an alkaloid), one tenth of one per cent.
- Aromatic volatile oil, two per cent.
- Resin soluble in ether and alcohol.
- Resin soluble in alcohol ; insoluble in ether.
- Fatty matter, five per cent.
- Gum, citric acid, tannin, albumen, chlorophyll, wax, sugar, oxalate of calcium.
- Ash, ten per cent.
- Soluble matter 67½ per cent.
- Insoluble matter 32½ “
- Total 100 per cent.

The alkaloid boldina may be obtained in two ways: by exhaustion with ether and by exhaustion with acidulated water. It is soluble in ether, alcohol, chloroform; almost insoluble in water, to which it imparts a bitter taste. It is in the form of white scales.

A solution in acidulated water gives the following reactions:

Aqua ammoniæ precipitates the alkaloid, which is soluble in an excess of the alkali.

Liquor potassæ gives a precipitate soluble in an excess.

Solution of iodine in iodide potassium gives a precipitate of a red-brown color, insoluble in water, but soluble in diluted acetic acid.

Solution of iodohydrargyrate of potassium gives a light yellow precipitate.

Sulphuric acid gives a blood-red color to the solution.

The acid when dropped upon the alkaloid gives a dark-colored mass.

Boiled for a few minutes with a dilute acid, then tested with Fehling's solution, no precipitate is formed.—Pharm. Rec., Jan. 1884, 15, from Therap. Gazette.

CUPULIFERÆ.

Oak Bark—*Character of Tannin*.—See *Querci-tannic acid* and *Phlobaphene*, under “Organic Acids.”

Cork from Quercus Suber—*Chemical and Microscopic Characters, etc.*—Dr. Karl Kugler communicates a very exhaustive treatise on cork, its derivation, collection, development, chemistry, etc., which will be referred to with interest in Arch. d. Phar., March 1884, 217, 230.

Galls—*Review of the Varieties used in the Arts and in Pharmacy*.—Mr. C. Hartwich gives a comprehensive review of the galls employed in the arts and in Pharmacy. The paper embraces those produced on different species of *Quercus*, as well as those of *Populus*, *Tamarix*, *Rhus*, *Pistacia*, *Duvana*, *Distylium*, *Terminalia*, and *Gardenia*, all of which are exhaustively described and illustrated by numerous cuts (58). The

author enumerates 41 plants yielding galls, and 24 insects producing them. See *Archiv d. Phar.*, Nov. and Dec. 1883, pp. 819-840, and 881-911.

CONIFERÆ.

Thuja Occidentalis.—Character of *Volatile Oil*, which see under "Organic Chemistry."

RHAMNACEÆ.

Gouania Domingensis, Lin.; *Chewstick*.—Mr. J. Moeller gives the following description: The cylindrical stems are 8 to 16 mm. ($\frac{1}{3}$ to $\frac{3}{4}$ inch) thick; the dingy gray-brown bark is one mm. ($\frac{1}{32}$ inch) thick, longitudinally wrinkled and with difficulty separated from the wood. The very thin cork consists of somewhat flattened cells, with mostly the inner wall thickened and containing a red-brown mass. The middle bark contains chlorophyll, and in many cells single monoclinic crystals of calcium oxalate, the primary bast bundles in small groups, the fibres broad, usually roundish, and with distinct layers, occasionally groups of small, lemon-yellow stone cells inclosing crystals. The inner bark consists of extended bast bundles divided by the delicately-celled medullary rays and surrounded by rows of crystal cells. The bast fibres are long, thin, and characterized by the sharply-defined primary membrane. The sieve tubes in the inner layer are prominent from their large apertures, and in

FIG. 52.

Gouania; transverse section.

the older layers appear shrunken in branching cords, forming the so-called horn-bast. The joints of the sieve tubes are about .4 mm. long, and have the transverse membrane horizontal, coarsely porous, and mostly covered with thick callus. The bark is free from starch.

Zinc chloride with iodine imparts a violet color to the entire primary bast fibres, and with considerable swelling to the secondary layers of the secondary bast fibres, and to the sieve-tube walls. All other cell membranes are colored yellow, and the contents of tangential groups of parenchyma cells in the soft bast brown. These contents are insoluble in cold water and potassa solution, almost completely soluble in boiling

water, and are colored black by ferric salts. Other parts of the bark are free from tannin. The bast parenchyma is thin walled; the cells of the medullary rays become sclerotic only in old stems.

The wood is in circular layers, the early ducts of each year often larger, the several layers varying in thickness, occasionally rather compact, frequently very porous, the wood cells not numerous. The ducts are usually imbedded in parenchyma, appear transversely round or roundish, are sometimes .3 mm. in diameter, and upon the walls dotted. The parenchyma contains rows of crystal cells; the pith has the cell walls somewhat thickened and contains scattered crystals.

The bark has a bitter taste. The yellow coloring matter is contained in the membrane, and yields with hot water a tasteless solution which does not react with ferric chloride or alkalies.—Amer. Jour. Phar., Aug. 1883, 417-418, from Phar. Centralhalle, 1883, No. 14.

B. ANIMAL DRUGS.

Leeches—Preservation.—According to "Pharm. Ztg." it has lately been recommended to keep leeches in water in which one-thousandth part of salicylic acid has been dissolved, and to renew this water every three weeks. The leeches are said to keep well, and to retain their full suction power. New Rem., Dec. 1883, 361.

Cantharides.—Presence of Formic Acid.—*Cantharides* contain, according to Eug. Dietrich, notable quantities of formic acid. This acid is the best solvent for cantharidin, the solubility increasing with the strength of the acid. Cantharidin dissolved in diluted formic acid, may be distilled. Phar. Post, 1883, No. 18.

Legen—An East Indian Substance Containing Strychnia.—In the summer of 1882, Dr. Bettink, of Utrecht, received from a friend in the Dutch East Indies a bamboo box filled with grayish-black granules, which was a sample of a substance known in Java under the name *dendang* or *lègèn*. The sample was accompanied by copies of papers on the natural history, physiological effects, and chemistry of the substance, written by J. Gronemann and E. Verschoof, and printed in the *Geneesk. Tijdschr. v. Ned. Indië* (deel x., afl. 6). Dr. Bettink communicates the most important portions of these papers, and adds some statements of his own, which are given below in abstract.

Legèn or *dendang*, which is sold in Java both as poison and as medicine, is said to be derived from a bug which is also called *dendang*; and *legèn* is said by the Javanese to be the excrement of this bug.

Gronemann, who witnessed himself two cases of fatal poisoning by the substance, noticed symptoms which confirmed his previous suspicions that the poison must contain strychnine.

The bugs which were said to yield these strychnine-holding excrements were thereupon examined by him and found to belong to the family of the *Cantharidæ* (Blanchard), sub-genus *Lytta* (Brullé).

The substance in question is described to occur in cylindrical pieces wrapped in palm-leaves; in most cases, the contents of these *rokós*—under which name they are brought from Borneo—are crushed. The bugs themselves appear to occur also in Java.

Verschoof analyzed the substance and found it to contain 12.47 per cent. of strychnine, but no brucine. On examining the bugs themselves, an extract prepared from them was also found to contain *strychnine* but no cantharidin.

The peculiar shape of the pieces, the microscopic appearance, and the large percentage of sulphates which occurred in Dr. Bettink's sample, led him to doubt whether the substance was an excrement, as alleged by the natives. Having only a small quantity of the substance, insufficient for a thorough examination, he applied to friends in Java for further samples, provided they could be obtained. It appears, that the sale of *légén* is forbidden in Java, and the ordinance to this effect had been renewed on the occurrence of those cases of poisoning.

Meanwhile, Dr. B. received another sample from Mr. Gronemann, with a paper (printed in the "*Geneesk. Tijdsch.*," 1882, 197), in which this author concludes that *légén* is *no* excrement. The bug appeared to him to be *Epicauta ruficeps* (Ill.), belonging to the group of cantharides, and also occurring in China and Japan. One of Mr. Gronemann's friends concluded, in view of the non-occurrence of uric acid and guanine in the substance, that it could not be an excrement.

The experiments which Gronemann undertook, to ascertain whether the bugs were insensible to large quantities of strychnine, proved that they could bear an amount of this poison, the four-thousandth part of which (in proportion to the weight of body of the bug to that of man), would have killed a man. Still this has no direct bearing on the occurrence of strychnine in the bugs, *as a natural constituent*.

The author being unable to obtain, for the present, any further supply of the substance, subjected the samples in his possession to a careful analysis. We quote only the results :

1. The absence of uric acid and guanine, the small amount of ammonia present, the microscopic examination, and the large amount of humic acid present, seem to prove that *légén* is not an excrement.

2. The large percentage of ash, and particularly also of sulphuric acid, seem to show that a sulphate (alum?) has been added during the preparation.

3. The substances from which the strychnine is derived are probably the seeds of some species of *strychnos*. It cannot be *nux vomica*, since no brucine is present.—*New Rem.*, Aug. 1883, 243, from *Nieuw Tijdschrift voor de Phar. in Nederland*.

Honey—Production in Canada.—A writer in "*Canad. Phar. Jour.*" (Sept. 1883) observes that while bees will feed on "glucose" with

avidity, and can be made to become mere carriers of this substance to the hive, this course cannot be economically followed, as dysentery is induced, and the bees are lost. Glucose can be mixed with honey after the latter has been taken from the hive, and in warm weather it is difficult to detect, but when cold weather sets in, such honey will not crystallize. There are three leading varieties of Canadian honey, named after the food of the bees in the localities where the honey is collected. These are white clover, basswood or linden, and thistle. They are equal in value, but clover honey has perhaps the preference. Buckwheat honey is produced to some extent, but is principally confined to the Erie coast, and is used by bee-keepers for feeding purposes, being too dark in color, and rank in odor, for table use. Owing to the modern method of extraction, on the centrifugal principle, the comb is uninjured, and will last perhaps ten seasons. When it has become dark, dirty or broken, it is melted and made into "foundation" by a machine devised for the purpose, which "foundation" is completed by the bees. In consequence beeswax is now seldom or never collected, the present supply being principally obtained from Africa.—Phar. Jour. and Trans., Nov. 10, 1883, 365–366.

Cod Liver Oil—Percentages of Iodine.—Mr. Edward C. C. Stanford draws attention to the percentages of iodine reported by different authorities to be present in cod liver oil. If these percentages are correctly stated, cod liver oil would be the richest source of iodine with which we are acquainted. The following are the percentages that have been given at different times:

	Iodine, <i>per cent.</i>
Dorvault found in cod liver oil	0.150
Raie found in cod liver oil	0.180
Joseph found nearly $\frac{1}{2}$ per cent	0.487
Machenroden found	0.162 to 0.324
Grager found in light brown oil	0.0846
Dr. de Jongh found in pale oil	0.0374
“ “ pale brown	0.0406
“ “ brown	0.0295

All these the author believes to be extremely high and improbable, whilst the following, obtained by Mr. Mitchell Bird (Phar. Jour. Trans., (2) I, 546), he believes to be nearer to the true percentage:

	As KI.		As Iodine.
1. Cod liver oil, Norway0021	} average	.001775.
2. Cod liver oil, Norway . . . . .	.0018	
3. Cod liver oil, Norway . . . . .	.0018	
4. Cod liver oil, Norway . . . . .	.0016	
5. Cod liver oil, Newfoundland0012	} average	.000993.
6. Cod liver oil, Newfoundland . . . . .	.0014	

Mr. Stanford, with a view to verifying his opinion, has also deter-

mined the iodine in different samples of cod liver oil, and communicates the method pursued.

The following six samples were selected:

No. 1. Cod liver oil, pale.

No. 2. Cod liver oil, Norway.

No. 3. Cod liver oil, manufactured by Carr & Sons, Berwick-on-Tweed.

No. 4. Cod liver oil, English.

No. 5. Cod liver oil, Newfoundland.

No. 6. Light brown cod liver oil.

The mean proportions of iodine found were, per cent. :

No. 1. 0.000410	} Mean percentage of iodine.
No. 2. 0.000434	
No. 3. 0.000276	
No. 4. 0.000138	
No. 5. 0.000315	
No. 6. 0.000360	
	0.000322.

Further experiments made by the author show that fresh cod livers contain more than twice as much iodine as the mean percentage in the oil; that salted codfish contains a considerable quantity, and that salted Scotch herring contained .00065 per cent. or four times the amount contained in the codfish. Amer. Jour. Phar., Dec. 1883, 612-617, from Phar. Jour. Trans. Nov. 3, 1883, 353.

Musk.—An interesting paper on the sources of musk, its commerce, adulterations, etc., taken from the report of the German Consul-General at Shanghai, will be found in "New Remedies," Sept. 1883, 279.

INORGANIC CHEMISTRY.

HYDROGEN.

Hydrogen Peroxide—Uses in Chemical Analysis.—Messrs. Alex. Classen and O. Bauer have employed hydrogen peroxide, prepared by Carl Roth & Co., of Berlin, with success in several analytical determinations.

Hydrogen peroxide converts ammonium sulphide to sulphate, and, what is the same thing, its solutions made alkaline with ammonia oxidize sulphuretted hydrogen. A number of metallic sulphides are very readily oxidized by an alkaline ammoniacal solution of hydrogen peroxide without any intermediate precipitation. This is the case with the sulphides of arsenic, copper, zinc, and thallium. In the case of this sulphide, the oxide of the metal is precipitated, while the whole of the sulphur is oxidized to sulphuric acid. Mercury sulphide, which is hardly attacked by nitric acid, is very readily oxidized by

hydrogen peroxide. A solution of cadmium sulphide forms a yellowish-white precipitate, soluble in hydrochloric acid. Several metallic sulphides, the solutions of which are precipitated by ammonia, are decomposed by hydrogen peroxide into sulphuric acid, and a hydroxide of the base, which precipitates, for instance, iron sulphide. The authors believe that hydrogen peroxide will soon be generally employed in analytical operations, as a clean, handy, and energetic oxidizing agent. Amongst other determinations which yielded good results may be mentioned the determination, in the presence of sulphuretted hydrogen, of hydrochloric, hydriodic, and hydrobromic acids.—New Rem., Oct. 1883, 308, from Ber. d. Deutsch. Chem. Ges.

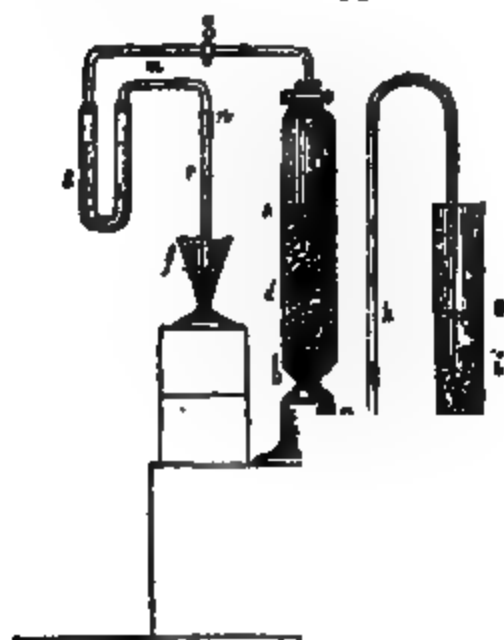
Peroxide of Hydrogen—Examination.—Four samples of peroxide of hydrogen, stated to contain 10 volumes, were examined by Mr. W. H. Symons. One contained chloride of barium, and was not further examined. Another had an acid reaction, left on evaporation a notable quantity of sulphate of potassium, and contained 6 volumes of peroxide. A third contains 0.6 per cent. of chloride of potassium, and 6.4 volumes of peroxide; and the fourth, which left scarcely any residue on evaporation, contained 8.1 volumes.—Phar. Jour. and Trans., Jan. 19, 1884, 563.

Hydrogen Peroxide—Physiological Action.—The action of hydrogen peroxide upon the living organism is poisonous in large doses, inasmuch as it affects the spinal marrow, the excessive irritation of which is shown by convulsions. The urine shows the presence of sugar. The fatal hypodermic dose for a dog of 3 kilograms in weight is 25 cm. (about 400 minims) of a 4 per cent. solution.—New Rem., Sept. 1883, 279, from Ber. d. Deutsch. Chem. Ges., 7, 1105.

Pure Hydrosulphuric Acid—Preparation.—In precipitating arsenic from solution, it is necessary to have sulphydric acid that is absolutely free from arsenic. Otto and Reuss recommend for the preparation of this gas the substitution of calcium sulphide for iron sulphide. The former may be prepared by heating gypsum and charcoal together at a high temperature. This is acted upon by pure acid free from arsenic. As no hydrogen is formed, any arsenical compound in the acid could not be reduced to arsenetted hydrogen. To obtain a steady and quiet current of gas, large pieces of the calcium sulphide are placed in a Woulffe's bottle, a little water poured on it, and a twenty-five per cent. hydrochloric acid allowed to flow slowly from a funnel with a stopcock, drop by drop. Barium sulphide is also an excellent material for this purpose.—Amer. Drug., May 1884, 94, from Chem. Zeit.

Sulphuretted Hydrogen—New Apparatus.—Dr. José R. de Luanco recommends an apparatus, constructed as shown, (Fig. 53) for the generation of hydrosulphuric acid. His principal object was to avoid, after the receding of the acid from the generator, the influence of the oxygen of

FIG. 53.

**Sulphuretted Hydrogen Apparatus.**

the air upon the wet fragments of ferrous sulphide, which are rapidly coated with a layer of basic salt.

A is the generator, closed below by a loosely-fitting glass ball (at *b*), upon which small glass pearls are placed, and upon these the ferrous sulphide. The bottom part bears a tubulure, to which is attached a siphon (the outer end of which is slightly turned up), which is made to dip into a tall cylinder containing the acid. The generator bears in its neck a cork, carrying a delivery tube provided with a stop-cock, and finally ends in the delivery-piece *n*, which is made to dip into water. To set the apparatus going, the cylinder *B* is raised by blocks until the level of the acid stands higher than the mark *d*. Then by sucking at *n*, the acid will be siphoned over. When the development of gas is to be discontinued, the faucet at *c* is closed, or rather rapidly closed and opened in succession, whereby the pressure of the remaining gas drives over the excess of acid into the cylinder without emptying it entirely. The cylinder is then placed so that the level of acid is below *d*, that is, below the line at which the glass pearls in the generator are in contact with the pieces of ferrous sulphide.—*Amer. Drug.*, Feb. 1884, 29, from *Zeitsch. f. Anal. Chem.*, 1883, 554.

Sulphuretted Hydrogen—Preservation of Ferric Sulphide.—Dr. Kuhl, after describing a cheap form of apparatus for generating sulphuretted hydrogen, draws attention to his method of preserving the unconsumed ferric sulphide. The latter is employed in pieces of the size of a bean, a layer of pebbles of the same size being placed in the bottom of the flask. When the generation of sulphuretted hydrogen has been interrupted, the residual ferric sulphide, after drawing off the acid, is washed with water and then covered with glycerin: the generating flask having a tap beneath, by means of which the glycerin can be perfectly drained off, and

completely removed by washing with a little water, when the generator is again to be used. Arch. d. Phar., May 1884, 374-378.

NITROGEN.

Nitrites—Uncertainty of the Permanganate Test.—Messrs. Leonard P. Kinnicut and John U. Nef have re-examined the process of assaying nitrite of sodium and nitrite of potassium by means of solution of potassium permanganate of known strength.

When carried out even with care, the results were found to be uniformly short of the required figure by about 16 or 15.5 per cent., but among the different results obtained there is a remarkable uniformity.

The same uncertainty, according to the authors, attaches to the estimation of sulphites by means of permanganate.—Amer. Drugg., Mar. 1884, 53, from Am. Chem. Jour.

Referring to the above, the Ed. A. D. remarks that the U. S. Phar. has adopted the permanganate process for the assay of spirit of nitrous ether. It is well known that the nitrite of potassium obtained as a step of this process is usually contaminated (or, at least, likely to be so) with other substances which likewise reduce the permanganate. And even if no other substances were present, the results of the two authors mentioned above would show that no reliable data can be obtained by this test. It seems that the only safe method is to estimate the nitrogen as gas, and a good method for this, easy of execution, is still a desideratum.

Nitrite of Potassium—Commercial Quality.—Mr. W. H. Symons examined two samples of commercial nitrite of potassium. One of them, old stock, deliquescent crystals, contained 86.2 per cent. KNO_2 ; the other, recently purchased, in slightly discolored sticks, contained 84.3 per cent. Phar. Jour. and Trans., Jan. 19, 1884, 563.

Nitrite of Sodium.—The same author has examined commercial nitrite of sodium. One sample, in flat light-brown pieces, contained only 6.6 per cent. NaNO_2 , whilst another, in small white crystals, contained 96.5 per cent. Phar. Jour. and Trans., Jan. 19, 1884, 564.

Nitrite of Sodium—Commercial Quality.—It has been shown by Howard, Miller, and Warrington (Phar. Jour., (2) vii, pp. 7, 95, and 204), that the product obtained by the process of the British Pharmacopœia, 1864—namely by fusion of a mixture of nitrate of sodium and charcoal—is a mixture of carbonate, hydrate, nitrate and nitrite of soda, the latter in varying quantity, never exceeding 42 and generally less than 25 per cent. To obtain a better article Mr. Howard suggested that the mixture should be dissolved and fractionally crystallized, the nitrite crystallizing after the carbonate and nitrate. Mr. Peter MacEwan observes that this undoubtedly yields a purer nitrite, but it does not get rid of the principal objections to the charcoal process, namely, somewhat uncontrollable deflagration and formation of a large percentage of carbonate. By the em-

ployment of other deoxidizing agents, such as lead or copper (in a fine state of division), these objections are overcome, and a product obtained having a higher percentage of nitrite associated with nitrate and a small proportion of hydrate. This, by fractional crystallization, will yield a salt containing "98 per cent. of real nitrite, the 2 per cent. of impurity consisting chiefly of moisture." Mr. MacEwan has subjected twelve samples, believed to fairly represent the commercial article, to examination, with the results given in the following table :

No.	Characters.	NaNO ₂ . Per cent.	Na ₂ CO ₃ . Per cent.
1	Large transparent pictures, very moist	0.011	35.5
2	"Old stock," small crystals, brownish	0.028	29.66
3	Large transparent crystals, very moist	0.945	32.6
4	Fused mass, white	9.6	27.34
5	White and granular, very moist	28.4	
6	White and granular, dry	84.14	
7	Small crystals, white, moist	92.5	
8	Small crystals, brownish, moist	93.65	
9	Small crystals, white, moist	95.1	
10	Small crystals, brownish, moist	95.83	
11	Small crystals, white, dry	97.21	
12	Small crystals, white, dry	98.5	

Nos. 1 to 3 are evidently the first crop of crystals from a solution of such a specimen as No. 4, which, itself, answers the description of the 1864 Pharmacopœia preparation. Nos. 5 and 6 contained undecomposed nitrate, and the former much water. The others contained water in varying proportions and but mere traces of other impurity, the higher percentages of Nos. 11 and 12 being accounted for by the fact that they were examined as received from the makers, while the others had been in stock for a few months.

The percentages in this case were determined by decinormal permanganate of potash solution, which gives good results with care and some practice. A very good plan is to fill a burette with a solution of the salt under examination (1 gram in 100 cc. distilled water is a convenient strength) and drop carefully into a flask containing 10 cc. permanganate and an equal volume of sulphuric acid (1 in 4) until a pale pink color is struck, which should not disappear within thirty seconds. The quantity of nitrite solution being noted, the titration is repeated twice, it being merely necessary to add 10 cc. of permanganate to the contents of the flask each time. The mean of the three estimations is taken for calculation, 10 cc. of permanganate solution being equivalent to .0345 gram NaNO₂. Old stock of this article should be looked over.—Amer. Jour. Phar., Oct. 1883, 512-514, from Pharm. Jour. Trans., Aug. 1883, 121.

Nitrite of Sodium—Proper Dose.—Drs. Ringer and Murrell have concluded that the ordinarily prescribed dose (20 grs.) is dangerously large. From some observations of Dr. A. H. Baines, in the "Lancet," Decem-

ber 1, 1883, it seems that this drug is often adulterated with nitrate of sodium, and from this fact has arisen the supposed necessity for such large doses. If we can procure the pure drug, and we ought to do so if we use it at all, two or three grains will be the dose. Dr. Baines reports a case of petit mal in which its use was very beneficial.—Amer. Jour. Phar., Feb. 1884, 710. from Med. and Surg. Rep., Jan. 19, 1884.

Nitric Acid—Sulphate of Paratoluidine a Reagent.—According to A. Longi, if a liquid holding in solution nitrates is mixed with a few drops of paratoluidine sulphate, and superstratified with sulphuric acid, there appears at the boundary of the two liquids an intense red coloration, which passes into a dark yellow only after a considerable time. Crude aniline may be used instead of pure paratoluidine. The red coloration can be recognized in fluids containing $\frac{1}{12500}$ nitric acid. The reaction is less sensitive than that obtained with brucine and diphenylamine, but it has the advantage of producing a different color (blue) with chloric, bromic, iodic, chromic, and permanganic acid. It can also be used for distinguishing nitric from nitrous acid, since it produces with the latter a yellow coloration, which gradually passes into red.—Pharm. Rec., Feb. 1, 1884, 64, from Gazzet. Chim. and Chem. News.

Nitric Acid—Determination in Water.—According to Williams, a strip of zinc which has been coated with copper by being placed into a three-per-cent. solution of sulphate of copper, is immersed into the liquid to be tested. Any nitric acid present is thereby converted into ammonia, which is precipitated by mercuric chloride as amido-chloride of mercury (white precipitate). If the water to be tested contains ammonia besides, the latter is determined by a separate assay, and deducted from the other.—Amer. Drug, June 1884, 114.

SULPHUR.

Sulphides.—Chloral-hydrate a reagent, which see under “Organic Chemistry.”

Hyposulphite of Ammonium.—*Use as a Substitute for Hydrosulphuric Acid in Chemical Analysis.*—Mr. Anton Orłowski describes a method of analysis in which ammonium hyposulphite is used in place of the unpleasant reagent, sulphuretted hydrogen. Ammonium, or sodium, hyposulphite precipitates from boiling solutions of metallic salts, previously acidulated by hydrochloric acid, all those metals which are precipitable from acid solutions by sulphuretted hydrogen, except lead, which remains in solution. Tin, antimony, and cadmium fail to be precipitated in *very* acid solutions. Those metals which are not precipitated from acid solutions by sulphuretted hydrogen are likewise not precipitated by ammonium hyposulphite; the salts of the alkaline earths, especially those of barium and strontium, and to some extent calcium, form hypsulphites which are decomposed by ammonia; protracted boiling converts them into sulphates and sulphites.

The systematic course of analysis is as follows: The slightly acid or neutral solution is gently heated, or mixed with ammonium hyposulphite, and the whole left to stand until the precipitate formed has completely settled. The precipitate, which may consist of the sulphates of lead, barium, strontium, and calcium, is washed, and then, to detect the lead, heated with an alkaline solution of ammonium tartrate. Lead is determined in the filtrate, and the alkaline earths, in the residue on the filter, in the usual way. The filtrate from the lead, barium, etc., precipitate, which must not contain any free nitric acid, is slightly acidulated with hydrochloric acid, heated to boiling, and gradually treated with successive portions of ammonium hyposulphite, avoiding an excess of the precipitant. The precipitate hereby formed contains the metals of the 5th and 6th group, with the exception of lead, and in some cases of calcium, all of which are determined in the usual way. The metals of the iron and aluminium group are precipitated from the filtrate by ammonium sulphide, ammonia and ammonium chloride being previously added; the precipitate may contain cadmium, and this metal is to be detected in the solution in which zinc and manganese are to be looked for. The slightly acid or neutral filtrate from the iron, etc., precipitate is heated with ammonium hyposulphite to boiling, and after cooling treated with hydrochloric acid—when manganese is present until the evolution of chlorine has ceased—the filtrate from the manganese peroxide precipitate thereby formed being dissolved in nitric acid and tested for cadmium, and the filtrate for zinc.

If in a portion of the filtrate from the precipitate caused by ammonium sulphide, when tested, a precipitate should be formed by the addition of ammonium carbonate, this can only indicate lime, since barium and strontium have been removed by the previous analytical process. Magnesium and the alkalies are detected in the usual way.—Pharm. Rec., Dec. 1, 1883, 462, Zeitschr. für Anal. Chem., Sept. 3, 1883.

Sodium Hyposulphite—Antiseptic Value in Cancerous Ulcers.—Dr. W. E. Buck writes in the "British Medical Journal" on the inefficiency of disinfectants in allaying the fetor of cancerous ulcers. The disinfectants tried were carbolic acid, sanitas, terebene, resorcin, creasote, boroglyceride, chloride of zinc, charcoal, etc. After failure with these, he tried a saturated solution of hyposulphite of sodium added to an equal quantity of water, and found it exceedingly efficacious. The ulcerating surface was well syringed and washed with the solution, and then covered with rags steeped in the solution. The granulations were kept clean, and the fetor was well kept under. This disinfectant is cleanly, has no smell, does not stain, and is very cheap.—Amer. Jour. Phar., Nov. 1883, 576.

Sulphurous Acid—Deterioration.—Mr. W. H. Symons has found a sample of sulphurous acid, which contained 6.72 per cent. SO_2 when

purchased, to assay 5.72 per cent. after being kept in an inverted stoppered bottle and not opened for four months. The B. P. demands 9.2 per cent., but such a solution cannot be obtained, and the author therefore considers that 7 per cent. is a good commercial specimen, and that 5 per cent. would be a much better standard.—Phar. Jour. and Trans., Jan. 19, 1884, 561.

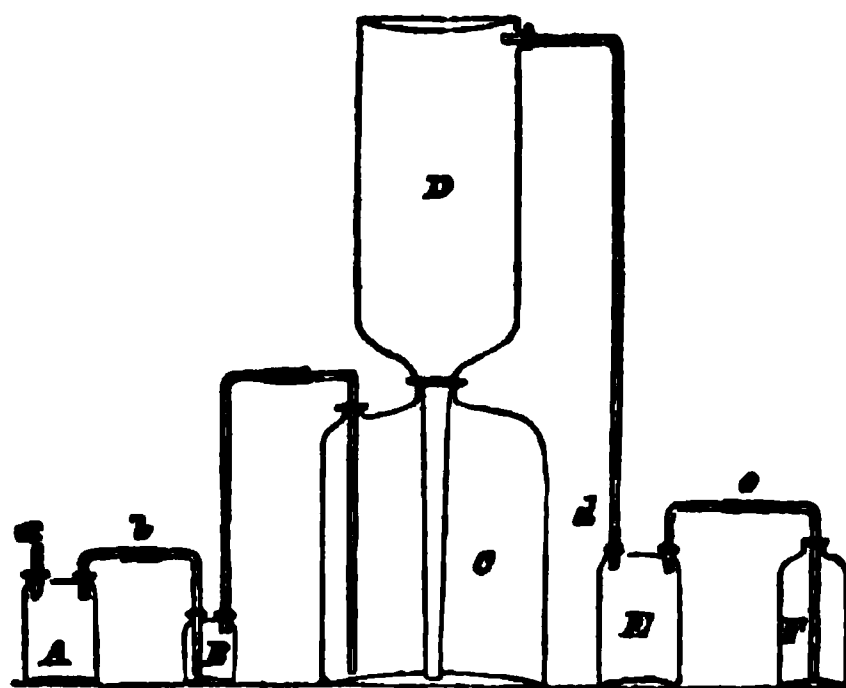
Sulphuric Acid.—Detection in *Citric* and *Tartaric Acids*, which see under "Organic Chemistry."

Free Acid—Detection in Presence of Salts.—Mr. Oscar Miller has made experiments with a number of indicators for the purpose of ascertaining their adaptability to the discovery of free acids in presence of salts, as, for instance, sulphuric acid in presence of sulphate of aluminium. He found that *tropæolin* (No. 00) is not altered by sulphate of aluminium, but is too slow in its action with free acids. *Ethyl-orange* is extremely sensitive against free acids, but is affected also by sulphate of aluminium, which colors it rose-red. *Methyl-orange*, on the other hand, whilst equally sensitive against free acids (being colored rose-red), is only colored orange by sulphate of aluminium. Hence it serves for the detection of free acids admirably.—New Rem., Dec. 1883, 367, Ber. d. D. Chem Ges., 1883, 1991.

CHLORINE, BROMINE, AND IODINE.

Chlorine Water—Apparatus.—After reviewing the difficulties ordinarily encountered in the preparation of chlorine water, Mr. Johann Hertel describes the apparatus illustrated by Fig. 54 as most convenient and suitable.

FIG. 54.



Chlorine Water Apparatus.

A is the generator; *B* a wash-bottle; *D* a glass vessel, ground so as to fit air-tight in the neck of *C*. *E* is an empty flask into which the tubes *d* and *e* do not reach deeper than just to the neck. Finally, *F* is a bottle with solution of potassa, or milk of lime.

When using the apparatus, *C* is filled with distilled water, hydrochloric acid is poured into *A*, chlorate of potassium added to it, and the stopper *a* (of *A*) firmly inserted. The generated gas passes through the wash-bottle *B* and the connecting tube *c* into the water contained in *C*, pressing this upward into *D*. The pressure thus produced in *C* facilitates and hastens the saturation of the water with gas.

As soon as no more gas is evolved, *c* is closed by a pinch-cock, *d* is disengaged from *D*, and the contents of the two vessels, *C* and *D* (after the latter are stoppered) shaken together until all free gas is absorbed.

When started, the apparatus may be kept going, if necessary, all night. For this reason, the vessel *E* is inserted to receive any liquid which might be sucked over from *F* in case a vacuum should be produced in *D* after complete absorption of the gas.

If the stoppers and joints are tight, a faint chlorine odor is perceptible only toward the end of the operation. The stoppers should be of india-rubber: or common corks may be used, if soaked in paraffin.

If the vessel *C* has a capacity of 1 litre, a quantity of 24 gm. of potassium chlorate and 240 gm. of hydrochloric acid (that is, 1 oz. of the salt to $\frac{1}{2}$ lb. of the acid) will be sufficient to produce the requisite amount of gas.

This apparatus may also be used for the preparation of solution of hydrosulphuric acid (sulphuretted hydrogen water).—Amer. Drug., Feb. 1884, 26, from Phar. Zeitschr. f. Russl., Oct. 30, 1883.

Hydrochloric Acid—Presence of Tin.—Mr. Ernst Schmidt draws attention to the occurrence of appreciable quantities of tin in commercial pure muriatic acid. He accounts for its presence by the supposition that the acid had been treated with stannous chloride to remove arsenic, and that on subsequently distilling the acid, the first portions, containing the stannic chloride, were insufficiently removed.—Arch. d. Pharm., Sept. 1883, 678.

Chlorinated Lime—Change on Keeping.—Mr. K. Thümmel communicates the results of experiments made with chlorinated lime to determine the changes and causes of the same, which occur by keeping. After giving the results of the examination of fifteen samples of chlorinated lime, all of which showed appreciable but variable losses of available chlorine on keeping, the author details special experiments made with the same of chlorinated lime. This sample was found to contain, when received, 35.9% of available chlorine, and a total quantity, including chloric acid, of 38.1%. Four portions of this chlorinated lime were placed in bottles, three of them (*a*, *b*, and *c*) being kept during two months of summer, excluded from the light: *a* in the cellar, open; *b* in the garret, closed; and *c* in the garret, open; the fourth sample, *d*, was kept in a closed bottle from July to October inclusive, and exposed to the direct light before a window facing to south. The changes in the several samples were as follows:

Sample.	Active Chlorine.	Active chlorine, and Chlorine as Chloric Acid.
<i>a</i>	29.7 %	30.9 %
<i>b</i>	31.2 %	34.3 %
<i>c</i>	23.0 %	28.8 %
<i>d</i>	5.9 %	24.2 %

These experiments again prove that decomposition takes place slower in cool locations, even if damp, and more rapidly in warm locations, even if dry ; also that in closed vessels a large proportion of the hypochlorous acid is converted into chloric acid.—Arch. d. Pharm., Jan. 1884, 20-22.

Chlorate of Potash.—Disadvantages of an excess of the powder in aqueous mixtures. See *Chlorate of Potash Mixtures*, under “Pharmacy,” p 85.

Chlorate of Sodium—Medicinal Value.—Dr. Trail Green advocates the use of chlorate of sodium in place of chlorate of potassium, finding it superior in every respect to the latter. It can also be given in larger doses.—Drugg. Cir., June 1884, 86.

Chlorides and Bromides—Qualitative Method of Determination. See *Silver Chlorides and Bromides*.

Bromine—Historical Notes.—Prof. James F. Babcock, in continuation of a series of similar papers, communicates some carefully prepared historical notes on bromine, which will be found very interesting, and particularly so to students. See “New Remedies,” Oct. 1883, 290-291.

Bromides—Reaction of Alkali Salts.—Dr. Hager observes that when 0.4 gram of a pulverized bromide be in a dry test-tube, and 4 or 5 cc. of a solution of cupric sulphate be allowed to flow down the side of the tube, the following effects will follow: When bromide of potassium is used and no iodide is present, it will remain uncolored. Bromide of sodium will be blackened, and, if pure, a greenish-blue solution will result. Bromide of ammonium gives a red-brown color.—Amer. Drug., April 1884, 65.

Hydrobromic Acid and Combinations.—Mr. Ad. Sommer contributes a lengthy paper in which he describes the different methods recommended for the preparation of hydrobromic acid, and its compounds, which see in Phar. Rec., Jan. 1, 1884, 6-8.

Hydrobromic Acid—Preparation on a Small Scale.—A simple process for preparing this acid is recommended by Grüning in the “Pharm. Zeitschr. f. Russl.”

100 gms. of bromide of potassium reduced to a coarse powder are put into a retort of about the capacity of 1 pint (or a little over), the retort connected with a gas delivery tube, and then 280 gms. of phosphoric acid of the spec. grav. 1.304 poured in. Heat is carefully applied by means of a burner, the retort standing on a piece of wire-gauze. At first, the bromide of potassium dissolves in the phosphoric acid, but subsequently,

when the liquid becomes less, some of it separates again, which causes the liquid to bump, but without any danger of breaking the vessel. After all the salt is dissolved, the liquid commences to boil quietly, water being carried over at first. Next, a little hydrochloric acid passes over, derived from the chloride always accompanying the bromide. This is separately collected, as long as the liquid distillate is acid. Finally pure hydrobromic acid gas passes over, which is collected in distilled water. To prevent the water from rising back in the retort, it is well to connect the delivery tube with the narrow outlet of a funnel, and to dip the wide mouth of the funnel just below the surface of the water.

The resulting hydrobromic acid may be adjusted either analytically or by the specific gravity. 100 parts of bromide of potassium yield about 80 parts of a 10-per-cent. acid.—New Rem., August 1883, 240.

Bromide of Ammonium—Presence of Barium Salt.—Mr. E. Schmidt has recently examined a sample of bromide of ammonium which contained considerable quantities of a soluble barium salt. A solution of the salt, 1:20, produces a copious precipitate of barium sulphate on addition of diluted sulphuric acid.—Arch. d. Pharm., Sept. 1883, 679.

Hypobromite of Sodium.—A New Reagent for *Ammoniac*, which see under "Materia Medica," p. 168.

Chlorine, Bromine, and Iodine—Detection.—In the December number, 1883, of the "Journal of the Chemical Society" some experiments are described on a process due to Vortmann, for the detection of chlorine, bromine, and iodine in mixtures. Mr. Francis Jones has recently introduced a method which is based on the same principle, but carried out in a simpler and more convenient manner, and which serves extremely well for the detection of the three elements. The process is carried on in the following way: Place a *small* quantity of the mixture to be tested in a good sized test-tube, add a few pieces of manganese dioxide, and then a little water. Add now *one* drop only of dilute sulphuric acid (one part acid to ten of water); a brown tinge indicates the presence of iodine. Boil the mixture, and confirm the presence of iodine by the violet vapors in the upper part of the tube. Continue the boiling till these vapors cease to appear, then add another drop of sulphuric acid and boil again till they cease. If necessary, repeat this addition of acid and boiling until violet vapors have entirely ceased. Now add about two cubic centimetres of the dilute acid and boil again: brown vapors indicate bromine. Continue the boiling until the vapors no longer smell of bromine, then add one cubic centimetre dilute acid, and boil again. When the vapors no longer smell of bromine, allow the residue to cool *completely*; add an equal bulk of *strong* sulphuric acid, and warm; a green gas, bleaching a piece of moist red blotting-paper at the mouth of the tube, indicates chlorine.

Occasionally some bromine comes off on addition of the strong acid,

but if so it is soon got rid of, and is succeeded by the chlorine, which is chiefly evolved on warming the mixture. As, moreover, moist red blotting-paper is far more quickly acted on by chlorine than by bromine, there can be no difficulty in distinguishing between the two elements.—Pharm. Rec., Jan. 15, 1884, 44, from Chem News.

Mr. F. Maxwell Lyte recommends the following convenient method for the estimation of haloids in admixture:

The haloids having been precipitated together with silver, the precipitate is to be collected, dried and weighed.

It is now dissolved in about thirty or forty times its weight of water by the addition of the least possible quantity of cyanide of potassium. A quantity of pure bromide of potassium is now added, which need not be above the weight of the precipitate. The cyanide is now decomposed by the addition of an excess of dilute sulphuric acid.

The precipitate, in which any silver chloride has become by this means converted into silver bromide is now collected on a filter, dried, and weighed.

It is once more dissolved by the least possible quantity of potassium cyanide, and the same quantity of water, and to this is now added one and a quarter times the original weight of the precipitate of potassium iodide.

The cyanide is now again decomposed by dilute sulphuric acid, and the precipitate once more collected on a filter, dried and weighed.

In this last precipitate all the silver is converted into iodide, excepting such as was iodide already. In the second experiment all became bromide, excepting such as was bromide or iodide already.

From the weights then obtained from the first, second and third weighings, the chlorine, bromine, and iodine may easily be calculated. Lyte uses this plan, dissolving in cyanide, as he finds sometimes that the addition of a soluble iodide or bromide may not suffice to decompose completely the bromide or iodide respectively. The cyanide used may be the ordinary commercial cyanide, *providing always*, as is usually the case, it be free from any trace of iodide.—Pharm. Rec., Feb. 1884, 64, from Chemical News.

Mr. A. Cavazzi states that from a mixture of chlorides and iodides the iodine can be isolated by a boiling solution of neutral ferric chloride, but if bromides are present bromine also is liberated. In order to remove the iodine alone from a mixture of the three kinds of haloid compounds, the author uses ferric sulphate instead of the corresponding chloride. It must be previously heated almost to redness in order to make it perfectly free from acid. As the calcined salt dissolves with difficulty in water a little ferrous sulphate is added, which increases the solubility and renders the solution permanent. Two grams ferric sulphate, in presence of 0.1 to 0.2 gram ferrous sulphate, dissolved readily in 25 cc. of boiling water. If

a mixture of chloride, bromide, and iodide is boiled with this solution the iodine alone is separated out. The author absorbs the iodine in potassa, reduces the iodate to iodine by means of hydrogen, which is evolved in the alkaline solution by aluminium, and precipitates the iodine with silver nitrate.—Ibid.

Iodine—Therapeutic Uses.—Dr. George H. Carpenter, of Moorefield, West Virginia, writes to the "Medical News," April 27, 1883, that he has secured excellent results in two cases of poisoning by the bite of the copperhead, from the internal administration of tinct. iodinii comp., fifteen drops in a third of a glass of water, and the local application of the tincture of iodine to the bitten limb or part.—Med. and Surg. Rep., May 26.

The employment of Iodine for the relief of the vomiting of pregnancy has been somewhat in vogue for a number of years. And while the success attending its use has been pointed out with more or less enthusiasm, its exact value has never been established. Dr. T. T. Gaunt ("Amer. Jour. Med. Sci.," April, 1883) has for a number of years been employing the compound tincture of iodine in drop doses in nearly all forms of emesis, and reports thirteen cases of the most varied character, in all of which vomiting was promptly arrested by the use of the drug.—Weekly Med. Review, April 28, 1883, Amer. Jour. Phar., Sept. 1883, 473.

Iodine.—Percentage stated by different authorities to be present in *Cod Liver Oil*, which see under "Materic Medica," p. 204.

Iodide and Bromide of Potassium—Administration.—According to Dr. Seguin, these salts are best exhibited in slightly alkaline, natural or artificial carbonated waters. Given in this manner, both the iodide and the bromide are less irritating to the mucous membrane of the stomach, the disagreeable taste is very much masked, and the salts are more quickly and more thoroughly absorbed. New Rem., July 1883, 195.

Iodide of Potassium—Commercial Quality.—Bertha Higgins has subjected the different commercial brands of iodide of potassium to examination. Seven samples were purchased, each being a pound bottle except the German, five of them having the names of American producers, one English, and one of German origin.

They were numbered from 1 to 7, No. 3 being English, No. 7 German, the five American samples bearing the label of two Philadelphia, two New York, and one Boston house as the makers.

They were severally tested for the presence of iodate of potassium, which was negative in all but one of the samples, No. 4, which responded promptly, giving the purple tint instantly. On testing for the presence of chlorides or bromides, the U. S. P. test provides that if there be a cloudiness within ten minutes after the manipulation, there is more than one-half per cent. of chlorides or bromides. Nos. 1, 6, 7 gave the faint-

est indications of traces, but Nos. 2, 3, 4, 5 all gave precipitates immediately. In the first three, the repetition of the experiment with additional tests showed the absence of any traces of bromides.

On testing for sulphates, Nos. 1, 3, 4, 5, 7 gave precipitates proving their presence.

On testing for alkalinity, Nos. 3, 5, 7 were least alkaline, 1, 2, 6 gave a distinct blue color to red litmus paper, and No. 4 was so alkaline as to cause a deep blue color. All the samples were free from iodine (uncombined), cyanides and nitrates.

In moisture they varied as follows, in numerical order: .318, .593, .452, 1.943, .248, .318, .308 per cent.

In conclusion, no one of the samples equals all the requirements of the U. S. P., even the samples of so-called chemically pure. But one had iodate present, and all the samples, while of fair commercial quality, do not fully represent the desirable feature of perfect purity.—Pharm. Rec., April 1, 1884, 144.

Iodide of Potassium—Excessive Alkalinity.—Mr. H. P. Reynolds draws attention to excessive alkalinity of commercial iodide of potassium. A number of specimens from the most prominent manufacturers were examined, and were found to contain from 1 to $2\frac{1}{2}\%$ of carbonate of potassium, besides traces of chloride and iodate.—Drug. Circ., July 1883, 98.

Ferrous Iodide.—Practical method of making into *Pills*, which see under "Pharmacy," page 87.

Ferrous Iodide—Permanent Solution.—Izard recommends the addition of a few drops of alcohol to the preparation as soon as the iodine has been combined with the iron. He regards the production of aldehyd as likely to take place, in consequence of which the oxidation of the ferrous salt is prevented.—Amer. Jour. Phar., Aug. 1883, 402, from L'Union Pharm., May 1883, p. 196; Bull. Soc. Phar. Sud-Ouest.

Lead Iodide—Error in Pharmacopœial Test of Purity.—Mr. H. C. C. Maisch draws attention to an error in the pharmacopœial test of purity of lead iodide. The Pharmacopœia of 1880 gives the following test: "On triturating 1 part of the salt with 2 parts of chloride of ammonium in a porcelain mortar, and adding 2 parts of water, a colorless liquid should result (absence of and difference from chromate)." The test of the Pharmacopœia was evidently copied from "Hager's Pharmaceutische Praxis," vol. 2, p. 741, but not without making a mistake in its rendition. A proper version from Hager follows: "If 1 part of lead iodide be triturated in a porcelain mortar with 2 parts of ammonium chloride, and 2 parts of water are added, decoloration must soon follow; otherwise the salt may possibly contain lead chromate."

If two grams of lead iodide be triturated in a mortar with 4 grams of

ammonium chloride, transferred to a test tube, and 4 grams of water are added, a magma of a white or whitish color, entirely free from any yellow tint, results, but not a solution, as stated by the Pharmacopœia. If heat be now applied, the golden-yellow color of lead iodide again makes its appearance, and changes, on further application of heat, to a pale yellow or yellowish white before dissolving. This solution is of a brownish-yellow color, and deposits lemon-yellow ramifying crystals; if allowed to cool slowly, these are soon covered by pale yellow or white silky, fine, acicular crystals; but if rapidly cooled the latter crystals only form.

On applying the test as proposed by Hager and admitted by the Pharmacopœia, the change of the mixture in color from yellow to white is most likely due to the formation of lead chloride and ammonium iodide, both of which salts are white; possibly a double chloride may be formed, or a white double salt containing both iodide and chloride. On the application of heat the lead iodide is reproduced before it is dissolved with the formation of one or more double salts. A reproduction of lead iodide, either wholly or in part, also takes place on diluting the mixture with cold water.

The test of the Pharmacopœia for the absence of lead chromate from lead iodide should read about as follows: "On triturating 1 part of the salt (lead iodide) with 2 parts of the chloride of ammonium in a porcelain mortar and adding 2 parts of water, the mixture should soon change to a white color, and when heated should dissolve without residue."—Amer. Jour. Phar., Feb. 1884, 91-94.

PHOSPHORUS.

Phosphorus—Solubility.—Mr. A. Peltz has ascertained the rate of solubility of phosphorus in ether by converting the phosphorus dissolved by a given quantity of ether into phosphoric acid, and determining the latter as ammonio-magnesian phosphate. He found that ether of the sp. gr. 0.731, when shaken for one hour with phosphorus, dissolved 0.9783 per cent. of the latter, and ether of sp. gr. 0.721, 0.9643 per cent.

100 parts of ethereal solution of phosphorus, therefore, contain almost exactly 1 part of phosphorus. For preparing the solution it is best to take finely granulated phosphorus, such as is obtained by melting in alcohol at 45° C. and shaking.

300 parts of alcohol of 95% dissolve 1.46 parts of phosphorus.

Glycerin dissolves only traces. From a solution of phosphorus in oil of turpentine, a white crystalline mass (turpentine-phosphorous acid of Schimff and Koehler) is gradually separated.—Amer. Drugg., May 1884, 96, from Pharm. Zeit. f. Russl.

Phosphorus—Determination in Presence of Lead Salts.—According to note on page 16, of the 5th edition of Otto's "Ausmittlung der Gifte" Schwanert has made the observation that lead salts have the property of

preventing the luminosity of phosphorus in Mitscherlich's apparatus. Mr. H. Beckurts now draws attention to the inaccuracy of this observation, and records a number of experiments, made with the assistance of Mr. Tychsen, which show that lead salts do not have the property of preventing the luminosity of phosphorus under the conditions named. Arch. d. Phar., Aug. 1883, 582-583.

Phosphorous Acid—Use as a Bleaching Agent.—Extensive investigations made in the Gewerbe Museum of Bavaria led to the discovery of a new agent for bleaching bones, etc., etc. Heretofore articles manufactured from bones were bleached after the usual process of ridding them from fat, by ether, benzin, sulphurous acid, chlorinated lime, and in the immediate past by peroxide of hydrogen. A far better bleaching agent is, according to the above-mentioned laboratory, phosphorus acid. The fat is freed in the usual manner, by digesting the substances in benzin or ether, and after thorough drying, they are left for a few hours in a solution of phosphorus acid containing one per cent. anhydrous acid; then they are washed with pure water and dried. Articles thus bleached present an appearance like ivory.—Phar. Rec., Mar. 1, 1884, 106, from Phar. Cent., No. 5, 1884.

Phosphoric Acid—Manipulation in Its Preparation.—Dr. E. R. Squibb, who has, during his extended experience, tried many of the processes that have been recommended for the preparation of phosphoric acid, finds none of them to possess any advantage over the officinal process, and recommends it, notwithstanding some inconvenience attending it. He recommends the following method of managing the officinal process:

Take of Phosphorus	16 parts.
Nitric acid, about	96 parts.
Hydrosulphuric acid gas,	
Distilled water	each a sufficient quantity.

Mix 32 parts of the nitric acid with 36 parts of the water, in a flask of three times that capacity; add the phosphorus in its commercial condition; set the flask in a water-bath, and heat the whole at the temperature of the boiling water-bath until the reaction slackens. Put the remainder of the nitric acid, undiluted, into a bottle, and by means of a very small siphon, or other equivalent arrangement, allow it to run into the flask drop by drop, or at a rate which just keeps up a moderate reaction, which is always controllable by the rate at which the acid is added. This moderate reaction can be kept up equally well by adding the acid at intervals, 1 to 2 parts at a time. When all has been added, the heating is continued until all, or nearly all, the phosphorus is dissolved. Transfer the whole to a porcelain capsule, heat it on a sand bath until the excess of nitric acid is driven off, cool, and dilute with distilled water to about

128 parts, and then pass hydrosulphuric acid gas through it until it is saturated. This is best done cold, in an ordinary bottle, which is not more than three-fourths filled by it. The gas should pass through slowly, and for a considerable length of time—say three or four hours at least—and the bottle should be from time to time corked and shaken. When, after shaking, the cork has a tendency to be drawn in, the saturation is incomplete; but when the tendency is to push it out, the saturation is complete, and the bottle is corked and allowed to stand over night. The dilute acid is then to be filtered through paper into a flask, the flask set into a hot water-bath for several hours, or until it no longer smells of the hydrosulphuric acid gas. Then filter it again through paper, and evaporate it in a tared capsule until it is reduced to about 70 parts. When thus finally concentrated it almost always has a brown tinge, from particles of organic matter which have accidentally got into it during the long process, from the paper filter or the air. A drop or two of nitric acid, added a little while before the end of the heating, will discharge this color by oxidation, and the after heating will drive off the products of the decomposition and the remaining traces of nitric acid. Then cool, and dilute with distilled water until the whole weighs 96 parts, or until the acid has a sp. gr. of 1.347 at 15° C. (= 59° F.), compared with water at its minimum density or 1.344 at 25° C. (= 77° F.)—Drug. Circ., Jan. 1884, 6, from “Ephemeris.”

Bones and Bone-Ash—Composition.—Wildt has shown that bone-ash contains less carbonic acid than the bone from which it is prepared, and since caustic lime is not formed he attributes this to the reaction between dicalcium phosphate and calcium carbonate, resulting in the formation of normal calcium phosphate and the liberation of carbonic acid and water.

H. Weiske shows that bone-ash contains sulphate, which is not found in bones, and must therefore be produced from the organic constituents during the incineration. On analyzing a number of sheep bones, the carbonic acid was found to vary in the different bones between 2.58 and 3.55 per cent., while in the bone-ash the variation was between 0.68 and 1.31 per cent., strong ignition evidently decreasing the amount. The sulphuric acid, SO_3 , in the bone-ash, varied between 0.40 and 0.90 per cent., strong ignition showing scarcely any influence on the result. The relations of the figures are such that the effect of the sulphuric acid formed does not alone explain the loss of carbonic acid, but that also a conversion of dicalcium into tricalcium phosphate, as explained above, must take place.—Amer. Jour. Phar., Aug. 1883, 423, Zeitschr. physiol. Chem., 1883, 474-478.

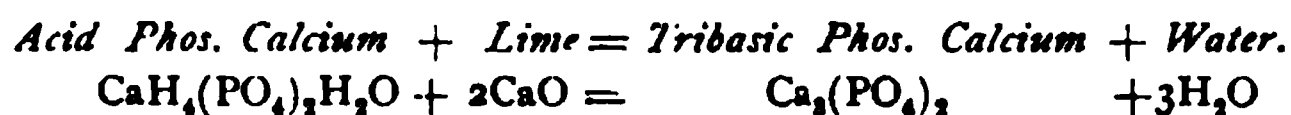
Calcic Phosphate—Preparations in Gelatinous Condition.—Mr. C. Tanret observed that when excess of alkali is added to a solution of tri-basic phosphate of calcium in hydrochloric acid, the phosphate of calcium

which is re-precipitated is gelatinous ; but, as this precipitate is very hard to wash, it is usual to heat the liquid in which it is suspended to the boiling point, that the precipitate may become coherent, after which it may be easily washed, drained, and dried.

This more compact or coherent form of the phosphate is, however, less easily attacked by the digestive juices, and the lighter, gelatinous preparation is probably preferable where it is desired to mechanically protect the membranous surface of the intestines. For this reason the gelatinous form has been recently proposed in place of the pulverulent phosphate. The difficulty of preparing and preserving it has, however, prevented its introduction.

Impressed by the superiority of this gelatinous phosphate, he has endeavored to devise an easy method for its preparation.

Crystallized acid phosphate of calcium (mono-calcic phosphate $(\text{CaH}_4(\text{PO}_4)_2 \cdot \text{H}_2\text{O})$) is treated with the requisite amount of caustic lime (CaO) to produce the tribasic phosphate (tricalcic phosphate $\text{Ca}_3(\text{PO}_4)_2$) which, in this case, is gelatinous. The reaction is as follows—



The presence of sugar in pharmaceutical preparations of this nature being usually unobjectionable, he dissolves the lime in simple syrup (forming a sucrate of lime) and adds this solution to the crystallized phosphate previously dissolved in water.

For 1.26 grammes of crystallized acid phosphate of calcium theory would require 0.56 gramme of pure caustic lime (CaO), or 0.74 gramme of perfectly hydrated lime $\text{Ca}(\text{OH})_2$, to produce 1.55 grammes of gelatinous phosphate of calcium ($\text{Ca}_3(\text{PO}_4)_2$).

But the acid phosphate, being hygroscopic, usually contains from 7 to 12 per cent. more water than is called for by the above formula, and caustic or slaked lime is seldom perfectly pure. For these reasons it is best to use 0.50 gramme of slaked lime ($\text{Ca}(\text{OH})_2$) for each gramme of the acid phosphate, the product of gelatinous tricalcic phosphate ($\text{Ca}_3(\text{PO}_4)_2$), being rather more than one gramme.—Pharm. Rec., May 1, 1884, 189.

BORON.

Boracic Acid—Poisonous Effect.—The “Louisville Med. News” (Nov. 24, 1883), draws attention to the fact that there is a fatal case reported in Schmidt’s “Jahrbücher,” following the use of an injection of a four per cent. solution of boracic acid for chronic diarrhoea ; and the Medical Record reports a death supervening upon its external use in an ulcer. The cases teach us that boracic acid is not so harmless as is usually supposed, and warn us to be cautious in its use, either pure, or in such combinations as borax, boro-glyceride, etc.—Amer. Jour. Phar., Jan. 1884, 21.

CARBON.

Bisulphide of Carbon—Poisonous Action.—Two cases of poisoning by bisulphide of carbon associated with insanity are published in the "Pacific Med. and Surg. Journal." The bisulphide of carbon seems to have been inhaled very slowly; some forty out of fifty pounds having evaporated, but in what space of time is not stated. The two sufferers were brothers, without taint of insanity in the family, and both of them exhibited a form of insanity associated with murderous intent. Dr. Bard, who had charge of the cases, and who advances the theory that the insanity was due to the bisulphide of carbon, also states that a manufacturer of the article in Los Angeles also developed similar proclivities.—Weekly Med. Rev., Nov. 10, Amer. Jour. Phar., Dec. 1883, 600.

CYANOGEN COMPOUNDS.

Hydrocyanic Acid—Determination in Presence of Non-poisonous Double Cyanides.—H. Beckurts recommends for the determination of hydrocyanic acid and poisonous cyanogen compounds in presence of non-poisonous double cyanides, such as ferro- or ferrid-cyanide of potassium, that the substance to be examined be rendered alkaline with caustic soda, or carbonate of soda, and then distilled in a current of carbonic acid. The presence of hydrocyanic acid in the distillate proves the presence of free hydrocyanic acid or of poisonous cyanogen compounds. The only exception to this method is cyanide of mercury, which is not decomposed, even in neutral solution, by carbonic acid. The method is a modification of that of Jaquemin. To determine the hydrocyanic acid in

Cyanide of Mercury, in presence of non-poisonous double cyanides, the method of Barfoed is recommended by the author, this method being applicable to the same purposes as the above, and being dependent on the solubility of hydrocyanic acid and mercuric cyanide in ether, whilst ferro-cyanic acid and ferro-cyanide of potassium are not dissolved. The method is carried out by Mr. Beckurts as follows: The substance, mixed with water, is acidulated with tartaric acid, and shaken repeatedly with ether. The ethereal solution is shaken with solution of soda, which takes up any free hydrocyanic acid as cyanide of sodium, and this is determined in the usual manner. The ethereal solution is distilled, the residue acidulated with sulphuric acid, and treated with sulphuretted hydrogen, whereby the mercuric cyanide is decomposed, hydrocyanic acid liberated, and determined in the well-known manner.—Arch. d. Pharm., Aug. 1883, 576-582.

Hydrocyanic Acid—Determination.—Mr. Louis Siebold discusses the relative value of the British and United States Pharmacopœia processes for the determination of hydrocyanic, and expresses the opinion that, subject to the correction as to the volume of silver solution required to indicate a certain strength, and if precaution be taken for the absence of

chlorides from the magnesia and hydrochloric acid from the hydrocyanic acid, the U. S. P. process is as delicate and reliable as that of the B. P. —Yearbook of Pharmacy, 1883, 521-523.

Hydrocyanic Acid—Indication of Alkalinity in Its Estimation.—Mr. Peter McEwan observes that in the estimation of hydrocyanic acid by Liebig's process there is sometimes difficulty in ascertaining that the acid has become completely saturated with the alkali used, owing to the cyanide of sodium formed being alkaline to litmus, even in presence of free hydrocyanic acid. Mr. McEwan substitutes phenol-phthalein for litmus. This new indicator is not affected by cyanide of sodium, and if a single drop of its solution be added to the hydrocyanic acid previous to the addition of the soda solution, no change occurs until the acid is wholly converted into sodium salt, and the solution has become slightly alkaline. The solution may then be titrated as usual. The author uses a solution of phenol-phthalein containing 4 grs. in an ounce of proof spirit.—Phar. Jour. and Trans., Nov. 3, 1883, 341.

Hydrocyanic Acid.—Removal from *Oil of Bitter Almonds*, which see under "Organic Chemistry."

Dilute Hydrocyanic Acid—Modification of U. S. P. Process.—Mr. R. Rother observes that the first process of the U. S. P. is not suited to the operations of the shop, whilst the second is open to the objection that the cyanide of silver is difficult to decompose completely, and that the product is therefore liable to vary in strength. He finds the formula best adapted for the purpose of the Pharmacopœia to be that given in Fownes's Chemistry, and has transcribed this as follows:

Potassic cyanide, pure	65 parts.
Tartaric acid.	150 parts.
Alcohol.	675 parts.
Water sufficient to make	1538 parts.

Mix the potassic cyanide and tartaric acid with 500 parts of water in a well-stopped bottle, or dissolve each separately in 250 parts of water, and mix the solutions; then add the alcohol and sufficient more water to make 1538 parts. The alcohol may also be mixed with 500 parts of water first, the two salts be then added, and enough water to make 1538 parts, as before. After the hydro-potassic tartrate has subsided as a heavy crystalline powder, the clear supernatant liquid is decanted.

The yield of officinal acid is 1350 parts, but the generated cream of tartar weighs 188 parts, thus making the 1538 parts as above directed. The solution contains mere traces of the acid tartrate.—Amer. Jour. Phar., Nov. 1883, 558-559.

Dilute Hydrocyanic Acid—Commercial Quality.—Mr. W. H. Symons has examined two commercial specimens of dilute hydrocyanic acid. The one contained 1.42 per cent HCy; the other 1.46 per cent. The

latter, after being stored four months in small blue bottles, stopper downwards, in shop cupboard, contained 1.36 per cent. Both samples contained a notable amount of chlorides. *Phar. Jour. and Trans.*, Jan. 19, 1884, 561.

Dilute Hydrocyanic Acid—Preservation in Vials.—Dr. E. R. Squibb has already in a previous paper drawn attention to the fact that the decomposition of dilute hydrocyanic acid in glass-stopped vials invariably begins between the ground surface of the stopper and the neck of the bottle. He had sought for the cause of decomposition in the emery or oil employed in grinding in the stoppers, in an action of the alkali of the glass—exposed by the grinding of the surface—but is inclined to the opinion that it is rather a mechanical or catalytic action. Indeed, he has kept the acid perfectly in a vial with a ground neck, stoppered with cork, and all his experience and observations tend to show that the acid will keep indefinitely if kept in vials well stoppered with sound corks. *Drug. Cir.*, Nov. 1883, 163, from “*Ephemeris*.”

Dilute Hydrocyanic Acid—Ready Test.—Dr. Squibb recommends the following approximately correct test: If one drop of officinal—or very nearly officinal—acid be added to 15 cc. of distilled water in one vessel, and one drop of test solution of nitrate of silver be added to 7 cc. of distilled water in a test-tube, and the first solution be dropped into the second from a pipette, and the contents be closely observed for a few seconds between the drops, a distinct opalescence should be observed before the fourth drop is added, and the opalescence become very marked as the fourth or fifth drops are added. If the acid be of full officinal strength, a faint opalescence will be observed in the upper part of the test-tube if closely looked for. Four or five drops may be required if the acid has lost a little in dispensing, and is near the end of a vial; but if more than eight or ten drops are required, the acid should be rejected.—*Ibid*.

Cyanide of Potassium.—Use as a distinctive test for *Gallic Acid*, which see under “Organic Chemistry.”

POTASSIUM.

Carbonate of Potassium.—Possible yield from the “ice plant,” *Mesembrianthemum crystallinum*, which see under “*Materia Medica*,” p. 179.

Potassium Nitrite—Commercial Quality.—See under “Nitrogen,” p. 208.

Sulphate of Potassium—Poisonous Action.—Mr. Alb. Frickhinger draws attention to the poisonous action of sulphate of potassium, which is not unfrequently prescribed as a cathartic in combination with infusion of senna. He considers it unsafe to employ more than 5.0 or at the utmost 10.0 grams at a time, and the salt should be in very fine powder, since it is quite possible to judge from the cases that have come under his obser-

vation that to the mechanical effect of the sharp crystalline particles the poisonous effects observed are in part due.—Arch. d. Pharm., Oct. 1883, 754-758.

Potassæ Sulphas cum Sulphure—Composition.—Messrs. T. Maben and M. Deshan, having found in the course of business that the potassæ sulphas cum sulphure of commerce varied considerably in character, have undertaken the study of the causes of this variation and to ascertain its composition. The direction for its preparation (Edin. Pharm. 1841) are as follows: “Take equal parts of nitrate of potassa and sulphur and mix them thoroughly. Throw the mixture in small successive portions into a red-hot crucible and when deflagration is over and the salt has cooled, reduce it to powder and preserve it in well closed bottles.” When prepared strictly in accordance with these directions the salt obtained varies very little in composition, provided small quantities only are operated with; with large quantities considerable variation may be expected. The color of the substance ranges from yellowish-white to grey. The more yellow powder is obtained when the preparation is conducted throughout at a red heat, the color varying slightly with the temperature. If a glazed crucible is employed and care taken in the preparation, the salt should always be more or less of a yellow color.

The authors have analyzed seven samples, the results being given in the following table. Nos. 1, 2, 3, and 6 were purchased; Nos. 4, 5, and 7 were prepared by them; No. 4 in very small quantity at a red heat; No. 7 at a red heat, but in large quantity; No. 5 at the lower temperature at which deflagration took place:

	1.	2.	3.	4.	5.	6.	7.
Potassic sulphate	95.9	92.5	97.75	96.5	97.0	96.0	97.5
Potassic sulphide	0.6	1.2	0.4	0.1	0.7	0.8	0.6
Free sulphur	1.0	0.4	0.5	0.5	0.4	0.5	Trace.
Insoluble matter	0.5	4.1	0.5	1.5	0.6	0.5	0.25
Mixture and loss	2.0	1.8	0.85	1.4	1.3	2.2	1.65
	100.00	100.00	100.00	100.00	100.00	100.00	100.00

The results show that while all the samples contain sulphide, No. 2 alone can be said to contain more than a trace. The authors consider it possible, however, that the salt may be prepared under such condition that it will contain a large percentage of the sulphide, should such be desired. The salt, which formerly was held in high estimation, has of late fallen into disuse, being used now almost exclusively in the preparation of artificial Harrogate salts.—Phar. Jour. and Trans., March 1, 1884, 697-698.

SODIUM.

Alkalimetry—Use of Litmus, Methyl Orange, Phenacetolin, and Phenolphthalein as Indicators.—Mr. Robert T. Thomson has read a very ex-

haustive paper before the Chemical Section of the Philosophical Society of Glasgow, in which are detailed the results of a series of experiments carried out with a view of testing, in as complete a manner as possible, the merits of litmus, methyl orange, phenacetolin, and phenolphthalein, as indicators in the estimation of alkalies and certain free acids. Instead of taking these indicators in succession, and recording all the tests made with them, the author has considered it preferable to take the substances which were tested by the standard acid or alkali, and state the results obtained with each indicator. The details of these very exhaustive studies cannot be given here, but it may be convenient for reference to note the substances thus tested, as follows:

1. Soda existing as hydrate with a small proportion of carbonate.
2. Available potash in caustic potash.
3. Ammonia existing as hydrate.
4. Alkalies existing as carbonate and bicarbonate.
5. Behavior with sulphates, nitrates, and chlorides of the alkalies.
6. Effect of the sulphites of the alkalies.
7. Effect of thiosulphate of sodium.
8. Effect of sulphide of sodium.
9. Effect of the phosphates of the alkalies.
10. Effect of silicate of sodium.
11. Effect of alumina.
12. Effect of the nitrites of sodium and potassium.
13. Determination of soda in borax.
14. Determination of free sulphuric, nitric and hydrochloric acids.
15. Determination of free oxalic acid.
16. Determination of acetic acid.
17. Determination of tartaric acid.
18. Determination of citric acid.—Phar. Jour. and Trans., Feb. 23, March 1 and 15, 1884, pp. 670-672, 704-705, and 740-743.

Soda Manufacture—Practical Notes.—Mr. A. Scheurer-Kestner contributes some practical notes and observations on the soda industry, which, as abstracted in "Jour. Chem. Soc.," Sept. 1883, are reproduced here.

I. *Loss of Sodium in the Le Blanc Process.*—Eleven years ago the author established that the loss of sodium experienced in the Le Blanc process is proportional to the quantity of chalk employed. It is thus to the interest of the manufacturer to avoid excess of chalk, but at the same time to use a quantity sufficient to ensure perfect whiteness of the finished product. The author put forward the hypothesis that the loss is occasioned by the formation of a sparingly soluble calcium-sodium carbonate; this view has been confirmed by the researches of Jurisch, Watson Smith, and Liddle and Reidemeister. The latter has found in the lixiviating vats crystals of the composition of gaylussite, $\text{Na}_2\text{CO}_3, \text{CaCO}_3, 5\text{H}_2\text{O}$, a compound insoluble in sodium carbonate and hydrate, mixed in the pro-

portion in which they occur in the crude lye ; it dissolves slowly in water, the crystals becoming opaque from the ready dissolution of the sodium carbonate.

Reidemeister has further shown that gaylussite is formed not only in the lixiviating vats, but also in the anhydrous state in the soda pans during fusion ; it probably also occurs in the residues, and the deposit of the caustification process, but its state of division prevents its detection and isolation.

II. *Presence of Vanadium, Fluorine, and Phosphorus in Crude Soda-lyes.*—In 1864, Rammelsberg detected the presence of vanadium and of sodium phosphate, $\text{Na}_3\text{PO}_4, 10\text{H}_2\text{O}$, in crude soda-lyes ; Baumgarten, a short time after, found fluorine existing as a double sodium phosphate and fluoride, $\text{NaF}, \text{Na}_3\text{PO}_4, 18\text{H}_2\text{O}$. From the red mother-liquors in the manufacture of the carbonate and hydroxide, Rammelsberg separated crystals, either white or red, from the presence of iron, which proved on analysis to be identical with Baumgarten's compound ; they also contained about 1.2 per cent. of vanadic acid. It is probable that the chalk and coal furnish the vanadium and phosphorus ; the origin of the fluorine is quite uncertain.

III. *Loss of Sodium in Caustification.*—The author has previously shown that the loss of sodium in caustification arises from the same cause as the loss of sodium in the Le Blanc process, *i. e.*, the formation of a double sodium calcium carbonate. Analyses by Jurisch ("Chem. Indust.," 1880, 376) would lead to the conclusion that this loss is less the greater the excess of lime ; but this statement is in direct contradiction to experience. According to Jurisch, the density of the liquor for caustification should not exceed 14° Baumé ; the author, however, points out that under ordinary atmospheric pressure it is impossible to caustify denser liquors than these, for the reaction became incomplete, owing to a commencement of a reverse chemical change. The author also criticises Jurisch's statements as regards the amount of combustible substance required for the evaporation of caustic soda of various densities.—Amer. Jour. Phar., Jan. 1884, 11–12.

Salt—Manufacture at Pomroy, Ohio.—Mr. Chas. C. Seebohm gives an interesting description of the manufacture of salt as conducted at the salt wells of Pomroy, Ohio, for which reference must be had to the author's paper in Amer. Drug., April 1884, 61–62.

Sodium Nitrite—Commercial Quality.—See under "Nitrogen," p. 208.

Dried Sulphate of Sodium—Preparation.—The Germ. Pharm. directs that the sulphate of sodium to be used for preparing the dried salt shall be in large crystals, and not in the form of the small crystals—resembling Epsom salts—which are by preference used for dispensing. This direction is evidently due to the prevalent opinion that the water of crystallization is not given off as readily from the small as from the large crystals,

and, being of the contrary opinion, Mr. Hermann Frickinger has made some experiments to decide this point. He finds, it is true, that the small crystals of sulphate of sodium do not part quite as readily with their water of crystallization as do the large; but the difference is so slight as to be quite immaterial. The only appreciable difference that is observed consists in the texture of the delapsed salt obtained from the two sources; that from the larger crystals being pulverulent, whilst that from the small, Epsom-salt-like crystals has a granular texture.—Arch. d. Phar., July 1883, 506–511.

Sodium Sulphocarbonate.—See under *Alcohols*, “Organic Chemistry.”

AMMONIUM.

Ammonia.—Chloral-hydrate a reagent, which see under “Organic Chemistry.”

Ammonium Chloride.—Action upon *Lead Iodide*, which see under “Iodine,” p. 218.

BARIUM.

Barium.—Presence in *Bromide of Ammonium*, which see under “Bromine,” p. 215.

Chloride of Barium—*Presence of Chloride of Aluminium*.—Mr. A. E. Brown notes the presence of more than 2 per cent. of chloride of aluminium in chloride of barium sold as chemically pure. No other impurities were found.—Amer. Jour. Phar., Jan. 1884, 9.

STRONTIUM.

Strontium—*Separation from Calcium*.—Mr. M. D. Sidersky gives the following method of separating strontium from calcium, which is based on the following reaction: When a mixture of oxalate and sulphate of ammonium is added to a salt of strontium containing calcium, the precipitate contains all the strontium in the form of sulphate, while the whole of the calcium is found in the form of oxalate. These two salts are then easily separated by dilute hydrochloric acid. By previously adding a little hydrochloric acid to the solution the precipitation of oxalate of calcium is prevented.

The method of working is as follows: Suppose a strontianite is to be analyzed. The powdered mineral is attacked at the boiling point by the smallest possible quantity of strong hydrochloric acid, and the solution supersaturated with ammonia, which precipitates iron, alumina, and silica. After filtration the liquid is concentrated by evaporation, acidulated with hydrochloric acid, and precipitated by a solution containing, per litre, 200 grms. of sulphate, and 30 grms. of oxalate of ammonium. This precipitates sulphate of strontium, which is collected on a filter and weighed after washing. The filtrate, supersaturated with ammonia, yields a precipitate of oxalate of calcium.

The analytical results which the author quotes in support of this method are satisfactory.—Pharm. Rec., Jan. 15, 1884, 42, from Chem. News and Zeitschr. f. Anal. Chem.

CALCIUM.

Sulphide of Calcium—Preparation and Uses in Scabies.—Dr. Dorlan says that sulphide of calcium, known in Poor-law service as golden lotion, is more effectual in the treatment of itch than conventional sulphur ointment. It may be made by the following formula: Flowers of sulphur, 100 parts; quick-lime, 200 parts; water 1000 parts. Boil the whole for some time, stirring occasionally until the substances became incorporated, allowing the liquid to cool, and decant into hermetically sealed bottles. It should not be made in a metal vessel.

It is applied as follows: The patient is first put into a warm bath; he is then painted with a brush dipped in the solution, and placed in bed, either in blankets or a flannel nightgown. After a short time, owing to the deposit of sulphur, the patient's body is almost the color of a guinea. The beneficial effects are speedily manifested; the itching ceases, and, as a rule, in simple cases, after another warm bath, the patient may be discharged cured.—Amer. Jour. Phar., June 1884, 340; Amer. Med. Digest, May 15, from Brit. Med. Jour.

Calcic Hydrate—Solubility in Water at Different Temperatures.—Mr. Thomas Maben has made some careful determinations of the solubility of calcic hydrate in water at different temperatures, and has incidentally made some interesting observations with reference to the causes of inferiority in lime water. The following table gives the results of the determinations made:

Temperature. Degrees C	Expressed in grains CaO per fluid- ounce	Expressed as 1 part CaO in water	Expressed as parts CaO in 100 parts water	Temperature. Degrees C	Expressed in grains CaO per fluid- ounce	Expressed as 1 part CaO in water	Expressed as parts CaO in 100 parts water
0	.576	759	.131	55	.396	1,104	.09
5	.572	764	.130	60	.385	1,136	.088
10	.568	770	.129	65	.362	1,208	.082
15	.561	779	.128	70	.354	1,235	.08
20	.553	791	.126	75	.333	1,313	.076
25	.526	831	.120	80	.321	1,362	.073
30	.507	862	.116	85	.315	1,388	.072
35	.481	909	.109	90	.277	1,579	.063
40	.469	932	.107	95	.265	1,650	.06
45	.444	985	.101	99	.265	1,650	.06
50	.429	1,019	.098				

—Amer. Jour. Phar., Feb. 1884, 110–114, from Phar. Jour. and Trans., Dec. 29, 1883.

Lime.—Detection in *Citric and Tartaric Acids*, which see under "Organic Chemistry."

ALUMINIUM.

Aluminium—Application to Coating Iron.—Dr. Gehring has invented a process by which ordinary iron may be coated with aluminium at little expense. He uses a Bunsen burner, with a blast or a muffle, and is then able to manufacture various objects of the durable metal for daily use, the coating of aluminium giving them a silver-white lustre.—New Rem., Oct. 1883, 312, from Scient. Amer.

Alumina.—Presence in *Saffron*, which see under "Materia Medica," p. 129.

Aluminium Sulphate—Characters.—The experiments of P. Marguerite-Delacharlouny lead him to the following observations:

Pure hydrated aluminium sulphate crystallizes in rhombic prisms, which are not hygroscopic, but, on the contrary, show a marked tendency to effloresce. Analyses of these crystals, prepared by different methods from different sources, prove that they have the composition $\text{Al}_2(\text{SO}_4)_3 + 16\text{H}_2\text{O}$. The formula $\text{Al}_2(\text{SO}_4)_3 + 18\text{H}_2\text{O}$, generally given to the hydrated salt, has been deduced from analysis of impure specimens containing ferric sulphate. The presence of a small quantity of ferric sulphate in aluminium sulphate makes the latter hygroscopic.

The natural aluminium sulphate found at Rio Saldana has the composition $\text{Al}_2(\text{SO}_4)_3 + 16\text{H}_2\text{O}$.—New Rem., Oct. 1883, 305, from Compt. Rend.

Alum—Effect upon the Teeth.—Mr. Young prescribed a gargle containing a small proportion of alum for a woman suffering from chronic pharyngitis with catarrh of the middle ear. The patient, finding relief, continued its use for some three weeks. But perceiving that, at meals, her teeth began to crumble into little pieces, she consulted her dentist, who considered it due to the alum gargle, as when the enamel is removed from the teeth, the alum breaks down the dentine. To prevent this, it is best, immediately after using an alum gargle, to wash the mouth out with a solution of bicarbonate of soda or an alkaline water.—Amer. Jour. Phar., Feb. 1884, 120, from "Courier Med.," through Med. and Surg. Reporter.

MANGANUM.

Permanganate of Potassium.—Uncertainty as a test for *Nitrites*, which see under "Nitrogen," p. 208.

Permanganate of Potassium—Uses in Analysis.—Mr. Arthur G. Haddock contributes an interesting paper, in which he points out the usefulness of permanganate of potassium as a reagent in different directions, for which see Phar. Jour. and Trans., Feb. 23, 1884, 668–670.

Permanganate of Potassium—Value in Diabetes.—This salt was recom-

mended in diabetes by Sampson as long ago as 1853. It has again been tried by Massin within the past two years, with success in some instances and complete failure in others. He conjectures that its influence is probably exerted on the liver, as manganese is eliminated by that organ, and even small doses injected under the skin cause fatty degeneration of it. He has observed that manganese is especially useful in those cases in which there is hepatic engorgement.—Amer. Jour. Phar., July 1883, 358, from Weekly Med. Rev.

FERRUM.

Perchloride of Iron—Use in Diphtheria.—Dr. Andresse, of Teltow (“Deutsche Med. Wochensch.”), recommends perchloride of iron in diphtheria, a gargle of five or six drops of the liquor to a small cupful of warm water, to be used several times a day by sick and healthy alike, and the affected throat to be thoroughly brushed with the liquor, diluted with two or three times its amount of water. The throat should also be sprayed with the same dilution as is used for gargling. Internally, he prescribes a solution of quinine (1 part in 120), of which a teaspoonful should be taken every hour undiluted, in order to obtain the beneficial effect of its local action.—The London Medical Record; Cinn. Lancet and Clinic, July 21, 1883; Amer. Jour. Phar., Nov. 1883, 565.

Ferric Oxide—Compound with Ethyl.—See *Ferric ethylate* under “Alcohols.”

Oxide of Iron—Manipulation in its Preparation.—Dr. Hirsch gives the following directions for making precipitated oxide of iron, which will be found useful:

In precipitating oxide of iron, the solutions must be *cold* and so far *diluted* that the iron solution contains not over 2 per cent. of metallic iron, and the ammoniacal liquid not more than 2 per cent. of gaseous ammonia. The iron solution must be poured into the ammonia, not vice versa. For stirring, a *stout* stirrer should be used, so as to be able to stir briskly and cause a quick reaction between the substances. For the same reason the iron solution is to be added, not rapidly and in large volume, but in a *uniform, very thin stream*, perhaps with the aid of a narrow siphon. Both during the precipitation and after its conclusion the liquid must always have a decided alkaline reaction. The precipitate is collected upon a conical linen (bag) strainer of known weight, and washed so that the surface of the precipitate is allowed to become exposed before a new portion of wash-water is added, which is then carefully stirred up with the oxide to a depth of 5, 10, 15, etc., centimeters, according to its total bulk. The stirrer and the inner sides of the strainer are then rinsed with plenty of water, which collects on the surface and acts by displacement. Next day the strainer is emptied by being turned inside out, well washed with water, the precipitate stirred up thoroughly with the washings until it forms a uniform thin magma, which is further diluted with

water and again transferred to the strainer. This manipulation is repeated until the washings cease to affect solution of barium or silver salts. Three or four times are usually sufficient, even for very long strainers (up to about 1 meter in length). The precipitate is now allowed to drain well, the bag then tied firmly above the contents, the whole *weighed* and placed under the press, where it is subjected to a pressure which must be increased only *very* gradually and cautiously, to prevent rupturing the bag. Small filter-bags require about 6, large ones 12 or more hours. The expressed liquid is caught in a receptacle, and weighed from time to time, in order to have some approximate idea of the weight of the residue, which is often useful to know. The pressure should be continued until the contents of the bag may be taken out in coherent pieces. Experience has shown that this is the case when the cake weighs about ten times as much as the metallic iron contained therein, or what is the same thing, when it weighs as much as the 10 per cent. iron solution originally employed. If the pressing is interrupted before, the residue will be a more or less dense magma, which separates from the strainer only with difficulty and is difficult to dry. The washed and pressed hydrated oxide of iron should then be dried at a temperature not exceeding 20° – 25° C. (68° – 77° F.) and the dry product should approximately contain 25 per cent. of water.—Amer. Drugg., April, 1884, 66.

Sulphate of Iron—Amount of Water of Crystallization in the Precipitated Salt.—Theodor Salzer draws attention to the fact that it is by no means certain that the precipitation of a solution of a sulphate of iron (ferrous sulphate) by means of alcohol, always produces a uniform salt, containing seven molecules of water of crystallization. He refers to former authorities (Gmelin) who state that alcohol can precipitate, from a solution of ferrous sulphate, a partly dehydrated salt. The percentage of water in the precipitated salt depends, according to him, much on the degree of concentration of the solution; besides, the subsequent washing with alcohol may still further reduce it. He also strongly protests against the employment of the precipitated salt for the preparation of volumetric solutions, inasmuch as the possible error thereby introduced may make the titre of the permanganate solution altogether too high.—Pharm. Zeit., No. 41.

In No. 49 of the same journal, Mr. O. Schlickum publishes a reply to Mr. Salzer's statement, in which he shows conclusively that the composition of precipitated sulphate of iron is quite constant, no matter how the manipulation is varied, excepting only that if the precipitated salt be *boiled* with strong alcohol, the product will be found to contain a smaller percentage of water of crystallization. If the operation is carried on in the cold, the resulting salt will always contain seven molecules of water.—New Rem., Sept. 1883, 277.

Ferric Sulphate—Antiseptic Action.—A writer in "Comptes Rendus" draws attention to a new property of ferric sulphate. When this salt is

as neutral as it can be, i. e., it does not cause effervescence with carbonate of sodium, and contains no perceptible quantity of ferrous oxide, nor any ferric chloride, which is always acid, it is capable of uniting with organic substances or vegetable extractives to form very definite and stable compounds, that are not removed by solution in water nor decomposed by contact with air. This property of neutral ferric sulphate has been applied to the preservation or mummification of animal substances, such keeping in a 3 per cent. solution apparently indefinitely, and when removed from it, drying without decomposition.—New Rem., Dec. 1883, 358.

Sub-Sulphate of Iron—Composition and Molecular Weight.—Mr. Spencer U. Pickering has published the results of a series of experiments made with a view of determining whether the composition and molecular weight of sub-sulphate of iron is $2\text{Fe}_2\text{O}_3\text{SO}_3 (=400)$, or $\text{Fe}_2(\text{SO}_4)_3, 5\text{Fe}_2\text{O}_3 (=1,200)$. He attempted to solve the question by ascertaining the unit of water removable from a hydrate specimen of it. His experiments (published in tabular form in the original) prove almost conclusively that no more complex formula than the triple one $[\text{Fe}_2(\text{SO}_4)_3, 5\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}]$ is required, for between the extreme hydrates actually obtained, thirty-three different hydrates are possible if the molecular weight be 1,200 (corresponding to the triple formula), and, if the molecular weight were double, namely 2,400, 66 hydrates would be possible. Now, of these possible hydrates, 14 have been obtained, all of which correspond to the molecular weight, 1,200, and not to 2,400. The odds, therefore, in favor of the true weight being 1,200, will be found to be about 95,000 to 1, and making allowance for the fact that many of these hydrates were obtained several times, these odds will be increased to as much as 14,400,000,000,000 to 1; in other words, it is practically a certainty that the molecular weight of basic ferric sulphate is 1,200, and that it may therefore be represented by the formula $\text{Fe}_2(\text{SO}_4)_3, 5\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$, but not by any simpler or more complex formula.—New Rem., Oct. 1883, 306, from Jour. Chem. Soc., xliii., 182.

Ferrous Arseniate.—Commercial Quality.—See under “Arsenicum.”

NICKEL.

Nickel Salts—Preparation.—Mr. Louis Genois communicates briefly the methods for obtaining the different salts of nickel, some of which, such as the nitrate, bromide, and iodide, may be prepared from the metal direct; whilst most of them are readily made by dissolving nickelous hydroxide or carbonates in the required acid. The author gives a formula for “Syrup of Bromide of Nickel,” which see under “Pharmacy.”—Pharm. Rec., Jan. 1, 1884-5.

CHROMIUM.

Chromic Acid—Percentage of Sulphuric Acid Present.—Dr. E. R.

Squibb discusses the pharmacopœial character of chromic acid, and considers the requirements of that standard satisfactory, with the single exception of the lack of a definite limit of the amount of sulphuric acid admissible. A "white turbidity" will be construed differently by different persons. Experiments made with an acid supposed to be strictly official, proved the formation of a precipitate, which, if calculated as sulphate of barium, would correspond to 6.1% sulphuric acid. A portion of this precipitate, however, consisted of chromate of barium, the actual quantity of sulphuric acid being subsequently found to be 5.6%. This should be the maximum quantity, and the chromic acid would be much better if it contained less.—Drug. Circ., Sept. 1883, 129, from "Ephemeris."

ZINCUM.

Pure Zinc—Preparation.—According to Prof. F. Stolba, zinc entirely free from arsenic and nearly free from iron may easily be obtained from the crude metal if it is exposed simultaneously to the action of the vapor of sulphur and of steam in such a manner that the melted metal comes in contact with the vapors while it is at the bottom of the crucible.

Plaster of Paris is intimately mixed with about one-fourth of its weight of powdered sulphur, and the mixture made into a thick dough with water. This dough is formed into balls of about five cm. (two inches) in diameter, and the balls are then, while still moist, stuck upon long wooden sticks, of suitable thickness, so that they will firmly adhere when dry. They are now ready for use.

The impure metal having previously been melted in a crucible, one of the prepared balls is pushed down in the melted mass so that it will touch the bottom. A copious evolution of sulphur vapor and steam then takes place at once, so that it is necessary to use some caution, since the metal is set into a violent motion. When the latter ceases the ball is removed, the outer crust removed, and the operation repeated until the impurities are removed. It is best not to use more than one kilo (two and one-fifth pounds) of the metallic zinc for one operation.

So far as the removal of arsenic alone is concerned, Prof. Stolba found that steam alone, or the vapor of sulphur alone will effect it, but any accompanying iron is best removed by employing the two agents together.—Amer. Drugg., May 1884, 95, from Pharm. Zeitung.

Calamine—Examination of Commercial Samples.—Mr. W. H. Symons has examined five samples of calamine. One was found to contain 90.5 per cent. of sulphate of barium, and three others were apparently similar, being unacted upon to any considerable extent by acids. The fifth sample dissolved almost completely in hydrochloric acid, with much effervescence, leaving only 2 per cent. insoluble. The solution yielded a copious precipitate with ammonia, completely soluble in excess. This sample of calamine lost 0.28 per cent. moisture at 105° C. ; but at a full red heat it lost 19.46 per cent.—Phar. Jour. and Trans., Jan'y 19, 1884, 561.

CUPRUM.

Copper—Toxic Action—It seems to grow more and more doubtful whether copper can be reckoned among the poisonous metals. Of course in large quantities it is noxious; but this is true of alcohol and of many other compounds which cannot fairly be considered as poisonous. The latest experiments tend to indicate that at any rate copper is not a cumulative poison, like lead. MM. Houlés and De Pietra Santa, in a recent communication addressed to the Académie des Sciences of Paris, report that they have been unable to discover any injurious action on the health of the workmen engaged in the copper industry, and have come to the conclusion that the so-called "*colique de cuivre*," asserted in the eighteenth century to be a definite disease, does not exist.—Amer. Jour. Phar., May 1884, 293; from Lancet; Louisv. Med. News, March 15.

Copper Subacetate—Adulteration and Substitution.—See *Acetic Acid*, under "Organic Chemistry."

PLUMBUM.

Lead—New Test.—Mr. A. Wynter Blyth draws attention to a new test for lead, which is particularly applicable to its detection in drinking water. A solution of cochineal is prepared by boiling the ordinary commercial cochineal in water, filtering, and then adding sufficient strong alcohol to insure its preservation from mould. A few drops of this solution added to a colorless neutral or alkaline solution, containing dissolved lead, strikes a deep mauve blue to a red with a faint blue tinge, according to the amount of lead present. The test will distinctly indicate a tenth of a grain of lead per gallon in ordinary drinking water; and, by comparison with a solution free from lead, much smaller quantities are indicated.

In searching for traces of lead in water, it is convenient to take two porcelain dishes; into the one place 100 cc. of the water to be examined, and into the other a solution of carbonate of lime in carbonic acid water, known to be lead free, and approximately of the same hardness as the water to be examined. Then add to each an equal bulk of the coloring matter, in quantity sufficient to tinge the water distinctly. The colors may now be compared; the slightest blue tint will be either due to lead or copper, for copper in very dilute solutions gives a similar tint, but in solutions of 1 to 1000 or stronger, the hue is so different as to differentiate the two metals.

The method is, within certain limits, applicable for quantitative purposes on the usual colorimetric principles. As a qualitative test, it is superior to hydric sulphide, and more convenient.—Amer. Drug., Mar. 1884, 93; The Analyst, Mar. 1884.

Lead and Tin—Action of Certain Vegetable Acids.—Mr. E. P. Hall has studied the action of various organic acids on the materials which are

exposed in cans used for the preservation of food, viz., tin and lead. Three alloys were made, taking into consideration the specific gravities of the metals, one with equal parts of each metal, one with excess of tin, and one with excess of lead. The metals were fused, well mixed together, cast into thin sheets in iron moulds, rolled into thin strips, and cut into pieces $\frac{1}{2}$ inch wide and 12 inches long, thus exposing one-fifth of a square foot surface. The tin and lead strips were of the same width, but varied in length for the reason stated above. The acetic acid solution employed contained 5.75 per cent. of acid, the solutions of tartaric and citric acids were made to an equal degree of acidity. After an exposure of two weeks to the action of the acids at 25° – 34° , all the metals were found to be tarnished more or less, the tin more so than the lead ; two of the alloys were sprinkled with small black crystals of lead ; the smallest pieces of lead in tartaric acid were covered with transparent crystals of lead tartrate. The solutions containing tin were yellowish, whilst those with lead were clear and colorless. The pieces of tin were covered with a dusty powder. The strips of metal were taken out, washed, dried and weighed. The solutions were precipitated with hydrogen sulphide. The lead gave dense black precipitates, finer in the tartaric and citric acids than in the acetic. The tin came down brown in acetic, and yellow and flocculent in the tartaric and citric acids. With the alloys, the precipitates were dark-brown in acetic and light-colored and flocculent in the other acids. The results are given in the table.

Some similar experiments were now conducted in stoppered bottles. In order to exclude air as much as possible, the bottles were heated, filled with acid while hot ; boiled ; and at once tightly stoppered. The results are given in the last line of the table.

Surface exposed in square inches . .	Per cent. composi- tion	Acetic Acid.				Tartaric Acid.				Citric Acid.																
		Percentage of dissolved metals.		Total amount dis- solved (in grams) from		Percent- age of dis- solved metals.		Total amount dis- solved (in grams) from		Percentage of dis- solved metals.		Total amount dis- solved (in grams) from														
		Lead	Tin	Alloys	Pure metals	Lead	Tin	Alloys	Pure metals	Lead	Tin	Alloys	Pure metals													
7.2 7.2 ..	100.0 34.1 65.9 100.0	} 11.54	88.46	0.3744	0.7122	9.73	90.27	0.0298	0.0664	10.15	89.85	0.1626	0.4785												
14.4 14.4 ..	100.0 60.8 39.2 100.0													} 13.57	86.42	0.4110	0.8242	11.23	88.77	0.0374	0.0750	13.42	86.58	0.1565	0.5439
21.6 21.6 ..	100.0 80.84 19.16 100.0																								
7.2 21.6 34.1	100.0 34.1 65.9 100.0	15.25	84.74	0.0341	0.1332	17.65	82.35	0.0102	0.0400	6.74	93.25	0.0267	0.0614												

Another series of experiments proved conclusively that galvanic action did not influence the rapidity of the corrosion, the action generally being slight at first, and increasing as time went on. Dilute acids, if in sufficient quantities, cause more corrosion than stronger ones. Some experiments were next tried on the tins themselves. Two hundred cc. of the acids were put into three empty tins, tied over with paper, and examined after two weeks. The citric and tartaric acids had removed the tinning. A white powder was deposited in the citric acid solution soluble in hydrochloric acid. The quantities of lead and tin dissolved were as follows:

Metals.	Grams dissolved by		
	Acetic acid.	Tartaric acid.	Citric acid.
Lead	0.0117	0.0873	0.1559
Tin.	0.4178	1.0430	0.6828

In addition to these metals, there was a good deal of iron dissolved. The lead was derived from the solder.

The result of the analysis of various samples of tin plate showed that the superior class, or "bright plate," was tinned with pure tin, and that this quality is the one almost universally used for tinware; the inferior class, or "Terne plate," as is understood, contains lead to the extent of 70 per cent. It is considerably duller than bright plate, and is used almost exclusively for roofing purposes. The analysis of commercial tin foil proves it to be of a very mixed character, from pure tin to stuff containing 90 per cent. of lead; the latter would prove deleterious if used for cheese or like substances.—Amer. Jour. Phar., Feb. 1884, 115-117, from Jour. Chem. Soc., Nov. 1883, p. 1038; Chem. News. xlvii, 290, 300.

STANNUM.

Tin—Its Presence in Canned Food.—Professor Attfield discusses the subject of tin in canned food, gives numerous analytical data, and sums up as a result of an experience of over fifteen years: 1. He has never been able to satisfy himself that a can of ordinary tinned food contains even a useful medicinal dose of such a true soluble *compound* of tin as is likely to have any effect on man. 2. As for the metal itself, that is the filings or actual metallic particles or fragments, one ounce is a common dose as a vermifuge; harmless even in that quantity to man, and not always so harmful as could be desired to the parasites for whose disestablishment it is administered. One ounce might be contained in about four hundred-weight of canned food. 3. If a possibly harmful quantity of a soluble compound of tin be placed in a portion of canned food, the latter will be so nasty, and so unlike any ordinary nasty flavor, so "metallic," in fact, that no sane person will eat it. 4. Respecting the globules of solder (lead and tin) that are occasionally met with in canned food, he believes most persons detect them in the mouth and remove

them, as they would shots in game; but if swallowed they do no harm. Pereira says that metallic lead is probably inert, and that nearly a quarter of a pound has been administered to a dog without any obvious effects. He goes on to say that as it becomes oxidized it occasionally acquires activity, quoting Paulini's statement that colic was produced in a patient who had swallowed a leaden bullet. To allay alarm in the minds of those who fear they might swallow pellets of solder, Prof. Attfield adds that Pereira cites Proust for the assurance that an alloy of tin and lead is less easily oxidized than pure lead. 5. Unsoundness in meat does not appear to promote the corrosion or solution of tin. He has kept salmon in cans till it was putrid, testing it occasionally for tin. No trace of tin was detected. Nevertheless, food should not be allowed to remain for a few days, or even hours, in saucepans, metal baking pans, or opened tins or cans, otherwise it *may* taste metallic. 6. Unsound food, canned or uncanned, may of course injure health, and where canned food really has done harm, the harm has in all probability been due to the food and not the can. 7. What has been termed idiosyncrasy must also be borne in mind. The author knows a man to whom oatmeal is a poison. Some people cannot eat lobsters, either fresh or tinned. Serious results have followed the eating of not only oatmeal or shell-fish, but salmon and mutton; *hydrate* (misreported *nitrate*) of tin being gratuitously suggested as being contained in the salmon, in one case. Possibly there were cases of idiosyncrasy in the eater, possibly the food was unsound, possibly other causes altogether led to the results, but certainly, to the authors mind, the tin had nothing whatever to do with the matter.

In the author's opinion, given after well weighing all evidence hitherto forthcoming, the public have not the faintest cause for alarm respecting the occurrence of tin, lead, or any other metal in canned food.—Amer. Jour. Phar., May 1884, 269–273, from Phar. Jour. and Trans., March 8, 1884, p. 719.

Tin—Presence in Preserved Fruit and Vegetables.—Messrs. Unger and Bodländer have examined a number of cans of preserved fruits and vegetables, with a view of ascertaining the quantity of tin which has combined with the latter. The investigation was begun in consequence of a married couple who had eaten of preserved asparagus, being taken ill with symptoms of some metallic poisoning.

The authors first examined preserved asparagus, and found in one tin containing 378 gm. of solids and 140 gm. of liquid, 0.166 gm. of tin; in another box, containing 325 gm. of solids and liquids, they found 0.041 gm. of metallic tin, with traces of lead. The liquid of the last-named sample, however, after filtration, was found free from tin. Preserved peas were found to contain 0.003 gm. of tin (with traces of lead) in 425 of the preserved mass.

The assay of tin in the liquid was performed in the following manner:

The liquid was evaporated, and the residue ignited, if necessary, with final addition of nitrate of ammonium. The ash was carefully mixed in a porcelain crucible with six times its weight of a mixture of equal parts of bicarbonate of sodium and sulphur, and heated until the whole was melted. The mass was then dissolved in water, filtered, the filtrate acidulated, stirred, and set aside until no more odor of hydrosulphuric acid was perceptible. The sulphide of tin was then filtered off, converted into oxide by ignition, and weighed.

It was found, as might have been anticipated, that the asparagus, etc., in contact with the sides of the can, contained the most tin. Since the tin could not be extracted from the solid vegetables either by boiling with water or by acetic acid, but only by means of at least a three per cent. hydrochloric acid, it is probable that the tin was present as a stannous oxide or salt.

Preserved fruits were likewise examined, and it was found that strongly acid fruits had absorbed notable quantities of tin, while the liquid portion remained uncontaminated.

The authors found that the eating of such contaminated preserves is not usually followed by acute morbid symptoms; the chief result is a slight inflammatory or caustic action of the digestive tract. Nevertheless, a caustic effect is by no means impossible, and some portions of the metal are actually absorbed. It may be safely stated that preserves contaminated with tin, if eaten continuously, are liable to produce injurious effects.—*Amer. Drugg.*, April 1884, 73, from *Pharm. Rundschau* (Leitmeritz).

Tin.—Occurrence in *Commercial Pure Hydrochloric Acid*; see p. 213.

MOLYBDENUM.

Molybdate of Ammonium.—Application to the micro-chemical determination of *Tannin*, which see under "Organic Chemistry."

BISMUTHUM.

Bismuth—Tellurium the Cause of the So-called Bismuth Breath.—Mr. William Reisert has made numerous experiments which add much to the already known facts concerning the cause of the production of the disagreeable, garlic-like odor of the breath of persons who have taken bismuth compounds. The author finds that this disagreeable odor is not observed when the bismuth compound is perfectly purified.

Chemically pure sesquioxide of bismuth was prepared by dissolving the commercial oxynitrate in chemically pure nitric acid, and precipitating with an excess of water. This operation of re-dissolving and re-precipitating was repeated twice, and the precipitate was then strongly heated in a porcelain crucible to convert it into bismuth sesquioxide, and at the same time to volatilize any arsenic which might have been contained in the substance. Tests for arsenic and tellurium in the resulting sesquioxide failed to denote their presence.

The bismuth sesquioxide thus purified was administered to five persons under the same, and under different conditions as to dose and time. From 0.5 to 1.0 gram was given three times daily for six days. No garlic-like odor could be recognized in the breath.

The garlic-like odor being more generally attributed to impurities in the bismuth compounds, and more particularly to the presence of small quantities of arsenious acid or tellurous oxide, experiments were made in this direction. Arsenious oxide was taken by the author in doses of 0.003 gm. after each of the three daily meals for three days. On the fourth day, on account of the griping pain produced in the abdomen, and a violent diarrhoea, only two doses were taken. There was not the slightest garlic-like odor perceptible in the breath.

Tellurous oxide (TeO_2) was prepared by treating metallic tellurium with nitric acid, evaporating to dryness and igniting the product. Some of the resulting tellurous oxide was taken by the author in doses of 0.005 gm. each. Three doses were taken on May 8, 1883, at 1, 4, and 7 o'clock p. m. In 15 minutes after the first dose the breath had a strong garlic-like odor, and in an hour a metallic taste was observed. An hour after the second dose the urine and sweat had the garlic-like odor, which was also observed in the fæces on May 12. The metallic taste was observed for 72 hours, and the garlic-like odor in the urine for 382 hours, in the sweat for 452 hours, in the fæces for 79 days, and in the breath it was still present, though very faintly, after 237 days.

Further experiments made upon different persons proved that an extremely small percentage of tellurium oxide will produce the effect described. The most dilute solution experimented with (0.0000001 gm.=1 cc.) communicated in quantities of 5 cc. the garlic odor to the breath in 75 minutes, and lasted about 30 hours. In quantities of 1, 2 and 3 cc. of this solution, given to different persons, no garlic-like odor appeared to be developed.—Amer. Jour. Phar., April 1884, 177-180.

Subnitrate of Bismuth—Test for Arsenic.—Dr. H. Hager draws attention to the fact that nitric acid of the sp. gr. 1.185, which dissolves subnitrate of bismuth to form a clear solution, also forms a clear solution with subarsenate of bismuth; but the latter is not dissolved when the acid is saturated with subnitrate of bismuth. If, therefore, 0.5 gram of sub-nitrate of bismuth is treated with 4 grams of nitric acid (sp. gr. 1.185) and does not dissolve completely in half an hour with occasional shaking, but is either turbid or exhibits a slight opalescence when viewed from above, it contains arsenic; a considerable quantity in the former case, in the latter but little.

The optical test for arsenic, which depends on the fact that arseniate of ammonia is not decomposed by heat into its true components, but rather undergoes an elementary decomposition, turning brown, is made as follows: About 3 to 4 grams of caustic ammonia are poured upon 1 gram

of sub-nitrate of bismuth, warmed to 30° – 40° C. (86° – 104° F.), and shaken, then filtered warm. One or two drops of the filtrate are placed on a thin watch glass, and heated by moving it to and fro over the chimney of a kerosene lamp, as long as vapors are noticed, that is, until all the nitrate of ammonia has been driven off, and a few minutes longer. On examining the residue by transmitted light, if arseniate is present, a brownish color will be observed, which becomes dark brown on the edges of the spot.—Phar. Jour. and Trans., Sept. 15, 1883, 208, from Pharm. Centralb.

Bismuth Salicylate.—Preparation, etc., see *Salicylic Acid*, under “Organic Chemistry.”

ARSENICUM.

Arsenic—Source of Error in Reinsch's Test.—Mr. J. Macallan draws attention to the possibility of error when testing for arsenic by Reinsch's method, and which seems to have been overlooked. He alludes to the deposition of free sulphur, together with cupric sulphide, on the copper, and its sublimation when heated. In examining decomposing organic substances, sulphur is frequently deposited, owing to the decomposition of free sulphuretted hydrogen, so much so, sometimes, as to take fire and burn with a blue flame when a lighted taper is applied to the copper. When heated in a tube, the sulphur forms a sublimate having a general appearance and behavior similar to that of arsenious oxide in small quantity, being white and resubliming unaltered. It is mentioned in some works that sulphur, cautiously sublimed, condenses in rhombic octahedrons, but he has not found it to deposit in that form. Under the microscope, it is seen to consist of globules. When, however, these are so small as to render their outlines indistinct, they resemble closely the crystals of arsenious oxide in transparency, lustre, and aggregation. When doubt exists, the safest course might be to procure as much of the sublimate as possible, boil down a second time with dilute acid and copper, and examine any sublimate obtained microscopically, and with the usual confirmatory tests.—New Rem., Sept. 1883, 275, from “The Analyst,” 1883, 64.

Arsenuretted Hydrogen—Action on Silver Salts.—The well-known reaction of arsenuretted hydrogen upon filtering paper impregnated with solution of nitrate of silver—producing at first a yellow color, which gradually changes to brown and black—has been the subject of critical examination by Mr. Robert Otto, who makes a preliminary communication in which, as the result of his experiments, he expresses the opinion that the yellow color is produced by the formation of a salt of the sub-oxide of silver, and not, as has been generally assumed, by the formation of arsenite of silver.—Arch. d. Pharm., Aug. 1883, 583–585.

Arseniate of Iron—Commercial Quality.—Mr. W. H. Lyman has ex-

amined two commercial samples of arseniate of iron, and found them to contain respectively 6.5 and 5.47 per cent. of ferrous salt. A sample made by him, according to the B. P. process, without special precaution, it being exposed to the air during washing and drying, for forty-eight hours, in order to imitate as nearly as possible the supposed condition of manufacture on a larger scale, contained 27.2 per cent., the Pharmacopœia requiring 37.91. Ferri arsenias being seldom used, is generally old and oxidized. An improvement would doubtless be to keep it in small quantities in closed tubes freed from oxygen.—Pharm. Jour. and Trans., Jan. 19, 1884, 504.

HYDRARGYRUM.

Mercuric Chloride.—A new test, in conjunction with alcohol, for atropine and other mydriatic alkaloids, which see under "Organic Chemistry."

Corrosive Sublimate—Use in Gonorrhœa.—Dr. Joseph McChesney, of Deming, New Mexico, contributes to the "Therapeutic Gazette," for December, a report of a series of seven cases of gonorrhœa in which he employed by way of treatment only a solution of corrosive sublimate, one grain to six ounces of water. The results are already very surprising. In several of these cases this injection was resorted to after a long and unsuccessful course with the ordinary remedies in such cases, and the result was uniform success. He resorts to these injections, which he gives once every four hours, after the subsidence of the acute stage. He is very confident that, properly applied, this solution will effect a cure of the gonorrhœa within from eight to ten days after it has been resorted to.

Mercuric and Mercurous Iodide—Separation.—Mr. H. Maclagan draws attention to the difficulty of separating mercuric from mercurous iodide by washing. He employed alcohol, ether, and chloroform for this purpose, but in each case the solvent seemed to exercise a decomposing influence on the mercurous compound. Chloroform seems to have less decomposing influence than alcohol or ether, or a mixture of the same, and is, therefore, to be preferred for analytical work.—Amer. Drug., May 1884, 82.

Mercuric Cyanide.—Determination in Presence of Non-poisonous, Double Cyanides. See under "Cyanogen Compounds."

Mercurous Tannate—Character and Uses.—Dr. S. Lustgarten reports on the chemical and physical properties of tannate of mercury (mercurous tannate), prepared in the laboratory of Prof. E. Ludwig, and used by Prof. Kaposi in various syphilitic affections.

The new preparation appears in the form of a dark green, odorless and tasteless powder, containing 50 per cent. of mercury. It is not soluble without decomposition, is not materially affected by diluted hydrochloric acid, but easily so by highly diluted solutions of alkalies (ammonia, po-

tassa), and of alkali carbonates, the effect of the reaction being that a magma consisting of very minute particles of mercury separates after a short time. These particles are so small that a large portion of them, when viewed under a microscope, is seen to exhibit the phenomenon of the so-called molecular movement. Whether this reduction process occurs also in the organism under the influence of the alkaline reaction of the intestinal juice, and whether mercury can thus be absorbed through the mucous membrane of the intestines in the same manner as it is absorbed when rubbed into the skin—these are questions which the reporter was not able, as yet, to answer. Nevertheless, a rapid introduction of mercury into the circulation could always be observed, it being always found in the urine twenty-four hours after having been administered.

The new preparation was given *internally* in doses of 0.1 gramme ($1\frac{1}{2}$ grains) two or three times per day. In spite of this relatively large dose, all disagreeable symptoms so often accompanying the use of mercurials, were absent. On the other hand, the results obtained with ten cases of syphilis in various stages, upon which it had been tried—among them difficult and obstinate relapsing forms, such as small papular, pustulous syphilides—were so rapid and favorable that the new preparation may be safely placed by the side of the best mercurials so far known, including mercurial ointment.—Amer. Drug., April 1884, 73, from Zeitsch. d. Oesterr. Apoth. V., No. 5, 1884.

ARGENTUM.

Silver—Prevention of Tarnish.—According to "Furniture Gazette," silver may be kept from tarnishing by painting it with a soft brush dipped in alcohol in which some collodion has been dissolved. The coating can be removed by dipping the article in hot water, but it completely protects it from tarnish.

Chloride of Silver—Acceleration of Precipitation.—According to Whittel, the precipitation of chloride of silver may be hastened if a few drops of chloroform be added to the liquid. The effect is purely mechanical, and may be useful also in the case of other precipitates which might require some time to separate.—New Rem., Sept. 1883, 278, from Scient. Amer.

Silver Chloride and Bromide—Action of Ammonia.—Mr. Alfred Senier communicates the results of some experiments made with the view of finding a quantitative analytical method for the separation of chlorides and bromides as silver salts. He finds that the solubility of silver chloride is not the same when mixed with silver bromide; that the solubility of moist, freshly precipitated silver chloride in ammonia solution (10 per cent. NH_3) is 1 gram in 17 cc. and of silver bromide is 1 gram in about 250 cc.; that the solubility of the chloride in presence of bromide is much less, so that when the proportion of bromide is one-half or more,

it is, on the whole, 1 in 50; that silver bromide is insoluble in a solution of silver chloride, 1 in 50; that silver chloride displaces silver bromide from its solution in ammonia, but that the unavoidable errors of experiment preclude the use of these facts in quantitative separation of the two acid radicals. On the other hand, the difference in the solubility of the two salts in ammonia, leads to an excellent quantitative method for the separation of chlorides and bromides, which the author prepares as follows:—Weigh enough of the salt under examination to give approximately half a gram of silver salt. If it is a potassium salt, weigh 0.25 gram, or 0.2 gram if a sodium salt. Dissolve in about 10 cc. of ammonia solution (10 per cent. N H_3). To the mixture add a few drops of solution of silver nitrate, and agitate. A permanent precipitate indicates presence of bromides equal to at least two per cent of the silver salts.—Phar. Jour. and Trans., July 1883, 1–3.

Nitrate of Silver.—Action of *Arsenuretted Hydrogen*, which see under “Arsenicum,” p. 242.

AURUM.

Salts of Gold—New and Characteristic Reaction.—Mr. Ad. Carnot states that if we pour into a small vial a few drops of a dilute solution of gold chloride, some drops of arsenic acid, two or three drops of ferric chloride, and the same quantity of hydrochloric acid, and about 100 cc. of water, and introduce a fragment of zinc, the liquid soon takes a purple color in the neighborhood of the zinc; and, on shaking, takes throughout a fine rose or purple color. The experiment thus conducted may last for half an hour, but it is completed in a few moments if we use some centigrams of zinc powder and shake the vial. The rose coloration is also immediate if we pour into the solution of the salt of gold, prepared in the same manner, some drops of the liquid obtained by attacking metallic iron with dilute hydrochloric acid, or better, by heating it with a mixture of hydrochloric acid and arsenic acid. It is diluted with water, and left in contact with an excess of metal.

This reaction is extremely sensitive. If one-millionth part of gold is present the change of color is very visible, and it may be distinguished even with a proportion of gold one-half less. The author proposes showing, at an early opportunity, how the same reaction may be applied in quantitative determinations. If phosphoric is used in place of arsenic acid, the coloration is blue or violet. Hydrochloric acid alone gives a rose coloration, but less bright than with the addition of arsenic acid.—New Rem., Oct. 1883, 305, from Compt. Rend.

OSMIUM.

Osmic Acid—Use in Neuralgia.—Professor Eulenburg has communicated some information as to his method of treating neuralgia with osmic acid. A one per cent. solution of the osmic acid crystals in distilled water

is used, and this should be kept in well-closed bottles protected from the light. Notwithstanding this precaution, the solution after a time darkens gradually and a dark, almost blackish, separation takes place, so that it is advisable to prepare only small quantities at a time. The darkened solution can, however, be used without disadvantages. The dose injected is usually 0.005 gramme (=0.5 of the solution); in exceptional cases 0.01 gramme (=1.0 of the solution) has been administered, but even this quantity produces no local or general disturbance. It is rather surprising that this pungent acid (resembling chlorine), which has a strongly irritating action on the outer cuticle, should cause so little pain when injected subcutaneously and scarcely produce any apparent change in the skin or tissue beneath it. At the most, there is, as a rule, only a slight reddening or possibly an insignificant swelling in the neighborhood of the puncture, but this quickly disappears. Sometimes the puncture may become blackened by the extrusion of a drop of the acid, but this has not been observed to cause any local inconvenience.—Amer. Drugg., June 1884, 108, from Pharm. Zeit. and Pharm. Jour.

Perosmic Acid—Remedial Uses.—This acid is a new remedy employed by Prof. Winiwarter in cancerous and scrofulous swellings. It is used by injecting daily 3 drops of a one per cent. solution of the acid, which treatment causes the tumor to soften and decrease in size, the dead tissue is thrown off and disappears in about a month. No curative effects upon the cancer itself have been observed from the remedy.—Amer. Jour. Phar., Nov. 1883, 561, from Rundschau, Leitm., June 20, 1883.

ORGANIC CHEMISTRY.

HYDROCARBONS.

(Including Volatile Oils and Resins.)

Paraffins—Method of Preparation.—The preparation of the so-called paraffins, that is, the saturated hydrocarbons of the fatty series, as methane, ethane, propane, butane, etc., has heretofore been a somewhat difficult operation. One of the students in the laboratory of the University of Tübingen, Mr. C. Köhnlein has, however, discovered a new general method for easily preparing them. It consists in heating the pure dry iodides of the corresponding paraffins with pure, absolutely anhydrous chloride of aluminium (free from excess of chlorine), in a vacuum for several hours at a temperature between 120° and 150° C.—New Rem., Oct. 1883, 293, from Ber. d. Deutsch. Chem. Ges., 1883, 560.

Naphthol—Antiseptic and Disinfectant Value.—A writer in "New Remedies" (Oct. 1883, 291–293) draws attention to the value and uses

of naphthol as an antiseptic and disinfectant, and gives a very comprehensive review of the experiments and observations that have hitherto been made by Kaposi, Weisser and others, with this substance.

Naphthalin—Use as a Remedy in Frost-bite.—Dr. Lindenbaum has employed this remedy with success in a number of cases of frost-bite. The dressing is usually changed every seven to ten days. In some instances the patients complained for two or three hours after the application of severe sticking pains, caused probably by small crystals of naphthalin. The same remedy seems to be equally beneficial in burns.—Amer. Jour. Phar., Jan. 1884, 51, from St. Petersburger Med. Wochenschrift, June 2, 1883; Med. Record.

Ichthyol—Nature and Source.—This new remedy introduced by Dr. Unna as a prompt remedy in certain skin diseases, is obtained, according to O. Rosenthal, from a bituminous mineral which is found near Seefeld, in the Tyrol. The color of the stone is light brown and brownish-black, and it contains a varying percentage of bitumen—between 10 and 60 per cent. The layers of the mineral are surrounded by a very “meagre” formation, the so-called “gallen-stein,” in which a great number of fish impressions, and even some fossil portions of fish, have been found. This led the geologist, Prof. v. Fritsch, to regard the bitumen as the animal residue of antediluvian sea-animals and fishes. Although the mineral deposit is situated about five thousand feet above the level of the sea, Prof. Fritsch’s theory is nevertheless quite plausible, since the bitumen can be shown to contain the basic substances found in bone-tar oils. At all events, the name *ichthyol* has been given to the new preparation, for the reason just stated.

The bituminous rock is subjected to a dry distillation in iron retorts, during which operation a tarry product of very offensive odor is obtained.

This separates, after standing some time, a thin, fluid, dark-colored oil. After it has been carefully purified [how?—ED.], it is treated with concentrated sulphuric acid. Sulphurous acid is thereby produced, and a sulphate is formed which must be freed from the excess of sulphuric and sulphurous acids. The result is *ichthyol*. This has a peculiar herb-like(?) odor, a faintly alkaline reaction, and contains ten per cent. sulphur, which is present in form of a sulpho-acid. It has been found impracticable to subject *ichthyol* to distillation, since it rapidly decomposes under these circumstances.—New Rem., July 1883, 197, from Deutsch. Med. Zeit., 1883, No. 17.

Thiophen—A New Substance from Coal Tar.—It has long been observed that benzol prepared from coal-tar, when treated with isatin and sulphuric acid, yields a magnificent blue coloring matter. Artificial benzol, however, prepared from benzoic acid, or from urine, or from toluol, fails to give this reaction. This peculiar behavior led Victor Meyer to

suspect that the coal-tar benzol is accompanied by a substance so closely allied to it in boiling point and other physical properties that it has hitherto escaped notice. As it was also known that coal-tar benzol was rendered brown by sulphuric acid, and thereby rendered "inactive," so as no longer to produce the blue coloring matter (indophenin), a process was devised which was carried out on a large scale in the aniline works of Bindschedler, Busch & Co.

Two hundred and fifty litres of the purest commercial (coal-tar) benzol was shaken during four hours with twenty-five litres of concentrated sulphuric acid, the resulting black-colored acid layer removed, diluted with water, and converted into a lead-salt. The latter was decomposed by heating with concentrated hydrochloric acid, or by the dry distillation of the lead-salt mixed with chloride of ammonium. The distillate having been purified with water and strong solution of potash, then dehydrated with chloride of calcium, finally yielded a fresh distillate containing about 70 per cent. of the new substance mixed with about 30 per cent. of benzol. The separation of these constituents is somewhat difficult and tedious; but there is finally obtained a new body containing sulphur, having the composition C_6H_4S , to which Meyer has given the name *thiophen*. It is a colorless, clear, very mobile oil, boiling at $84^\circ C.$ (corrected), not miscible with water, and having the spec. gr. 1.062 at $23^\circ C.$ (compared with water at the same temperature). It exists in commercial benzol, perhaps to the amount of 0.5 per cent.—New Rem., Sept. 1883, 268, from Ber. d. Deutsch. Chem. Ges., 1883, 1465.

Cærulignol—Characters, etc.—The high-boiling portions of beech-tar oil are characterized by the splendid blue color which they give with chloride of lime, or in alcoholic solution with baryta-water. According to Mr. P. Pastrovich the separation of the body to which this color is due—called by Reichenbach the "oxidizing principle"—from the other constituents of the tar-oil, is very difficult, but is best effected by boiling the oil for some time with the weakest acetic acid capable of dissolving it, and pouring the resulting solution into a large quantity of water, whereby the oil is separated, while a nitrogenous body remains in solution. The "blue oil," or Cærulignol, thus purified, distils between 240° and 241° ; it is nearly colorless, has a not unpleasant creosote-like odor and burning aromatic taste; sp. gr. = 1.05645 at 15° . It dissolves very sparingly in cold, more readily in hot water, and in almost any quantity in alcohol, ether, and acetic acid, forming neutral solutions. It is colored red by strong sulphuric acid, and when mixed with potash-lye, becomes dark-colored on exposure to the air. With chloride of lime, and in alcoholic solution with baryta-water, it produces the splendid blue color already mentioned. Its alcoholic solution is colored green by alcoholic ferric chloride; its aqueous solution gives a fine carmine color with aqueous ferric chloride.

Cœrulignol gives by analysis numbers leading to the formula $C_{10}H_{14}O_2$, which is confirmed by the vapor-density (5.69–5.84 by V. Meyer's method; 5.76 by calculation). By prolonged heating in sealed tubes at 140° with excess of strong hydrochloric acid, it is resolved into methyl chloride and a body which when purified by repeated crystallization from water and finally from benzene, is found to have the composition $C_9H_{12}O_2$ —its formation, represented by the equation $C_{10}H_{14}O_2 + HCl = CH_3Cl + C_9H_{12}O_2$, being exactly analogous to that of the compound $C_9H_{12}O_2$ from methylic propylpyrogallate. The solution of this body is colored green by ferric chloride, and when mixed with alkalis, gradually acquires a darker color in contact with the air.

Acetocœrulignol, $C_{11}H_{16}O_2 = C_{10}H_{15}AcO_2$, formed by boiling cœrulignol (3 parts) for two days with one part of acetic anhydride, was once obtained in fan-shaped groups of crystals, but mostly as a viscid, nearly colorless oil, insoluble in water, freely soluble in alcohol, ether, and acetic acid, boiling with partial decomposition near 265° .

Nitrocœrulignol, $C_{10}H_{13}(NO)_2O_2$, formed by treating cœrulignol with nitric acid of sp. gr. 1.2, separates from water or alcohol in honey-yellow crystals, resembling those of picric acid, and melting at 124° .

The decomposition of cœrulignol by hydrochloric acid, and the formation of its acetyl-derivative, show that it contains the groups OCH_3 and OH , and that it may accordingly be regarded as the methyl-ether of a higher homologue of one of the three dihydroxybenzenes, but to which has not yet been definitely decided.—*Amer. Jour. Phar.*, Feb. 1884, 118–119, from *Monatsh. Chem.*, iv, 188, through *Jour. Chem. Soc.*, Nov. 1883.

Pitch and Asphalt—Examination.—Mr. E. Davies, in a paper read before the British Pharmaceutical Conference, 1883, gives the results of an examination of some samples of pitch, with a table of their composition, from which it appears that the organic matter dissolved by petroleum spirit from samples of Trinidad and Syrian pitch contains 5 or 6 per cent. of sulphur, a much higher proportion than exists in any known vegetable substance.—*Yearbook of Pharmacy*, 1883, 559–561.

Essential Oils and Perfumes—Improved Method of Extraction.—Mr. Laurent Naudin, who has been occupied for a number of years in the study of the different methods for the extraction of perfumes and essential oils, has combined an apparatus by which he seeks to avoid the causes of failure of the methods hitherto in use. This apparatus, which is shown by Fig. 55, is based on the distillation of volatile solvents in closed vessels in a vacuum and at a very low temperature, and is composed of the following six elementary parts: (1) A digester (*A*) in which the perfume is extracted by contact of the volatile liquid with the odorous substance. Instead of a single digester, a series of vessels can be used, communicating

FIG. 55.

ers, removed mechanically during the digestion. (3) An evaporating vessel (*C*) in which the volatile solvent is distilled off, leaving the perfume as a residue. (4) A suction and forcing-pump (*P*) for the purpose of hastening the distillation of the volatile solvent by the aspiration of its vapors, and the condensation and liquefaction of the vapor, by compression in the refrigerator (*F*) and to collect, at the end of the operation, the traces of the solvent remaining in the different parts of the apparatus, and drive them into the refrigerator (*F*). (5) A cylindrical refrigerator (*F*) kept cool by one of the known methods, such as ammonia, sulphurous acid, etc. (6) A receiver (*R*) in which to store up the solvent employed.

The three vessels, *A*, *B*, *C*, and the refrigerator, can be hermetically closed by means of joints. The tube *T*, *T'*, which is in connection with the whole apparatus, distributes the vacuum caused by the pneumatic pump (*P*). This tube communicates with the vessels *A*, *B*, *C*, by the tubes *t*, *t'*, *t''*, supplied with taps. Air is readministered at pleasure by *r*, *r'*, *r''*, *r'''*, or by means of compressed air, consisting of air removed from

the apparatus and forced into a special receiver. The manometers, m , m' , m'' , indicate at any moment the state of the vacuum in each vessel. The level of the liquid solvent is shown by means of a glass window in each vessel (see E in A). The vessels A and C have each a double lining, so as to allow the introduction of air, or hot or cold water.

The flowers, leaves, etc., are introduced into the digester (A), and confined in a basket (U). The vessel is closed, and a vacuum, obtained by opening the tap (t), causes a suitable quantity of the solvent to ascend from the receiver (R) by the tubes n , n' . The materials having been left to digest for about fifteen minutes, the solvent liquid, charged with the perfume, is passed from A to B , in which a vacuum has been previously made, by connecting A and B by means of the tube G , H , which proceeds from the base of A . The water contained in the flowers is carried over mechanically by the solvent, and accumulates at the bottom of the vessel B , whence it is got rid of by the tube I . A glass window (E) allows the distinct separation of the two liquid layers. Communication being established between the evaporator (C) and the refrigerator (F), a vacuum is established by means of the tube t'' ; the solvent, charged with perfume, and free from water, is then allowed to run from the vessel (B) into the evaporator (C). Communication between B and C is then closed, and the refrigerator (F) cooled energetically, after which the pump (P) is set to work. The vapors of the solvent are drawn from C , and then forced into and rapidly condensed in F . During the distillation, the evaporator (C) is kept at the temperature of the surrounding atmosphere; this is effected by passing a current of water between the double lining, which restores the latent heat borrowed by the volatile solvent upon its conversion into vapor.

When a very energetic cold is at disposal, the employment of the pump as a means of liquefaction may be dispensed with. In this case, the vapor passes directly from C to F . After complete evaporation, a white or colored residue is found on the side of the evaporator C , which may be a solid, liquid, oily, or semi-fluid substance. If a sufficiently low temperature has been maintained during the distillation, the distillate (collected in R) will not be seriously tainted with any odor, and may be used in the manufacture of a different perfume. The perfume remaining in C being mixed with the wax of the flowers, leaves, etc., is separated from the latter by a given quantity of alcohol, contained in the vessel S , from which it is drawn through the tube L by means of a vacuum into C , and is left there to digest for some time. Solution is favored by the readmittance of air through K , which agitates the mixture violently; the liquid is then drawn off into the vessel S , which is kept at a temperature of -10° in order to precipitate the wax. The whole is then filtered at the same low temperature, and an alcoholic solution of the perfume is finished. In the manufacture of perfumed oils or fats, the perfume, mixed with the natural wax, is dissolved in the oil or fat at once.

The advantages of the apparatus and process are that the perfume is completely and quickly extracted, however unstable it may be; solution is effected in a few hours in an appropriate menstruum (alcohol, oil, grease or glycerin); pure perfumes, containing all the aroma, are obtained, owing to the low temperature maintained during extraction; the perfumes are condensed in an exceedingly small volume, and in a form which allows them to be kept for an indefinite period; the value of the yield is greater from all the perfumes than by the old method.

The choice of a solvent for the extraction of a particular perfume is not without importance, the delicacy and sweetness of a perfume depending upon the nature and purity of the solvent. The author has successfully employed the following extremely volatile liquids for the extraction of the perfume: Hydride of butyl (b. p. 0°); hydride of amyl (b. p. 30°); chloride of ethyl (b. p. 9°); chloride of methyl (b. p. -23°); and light petroleum spirit. The method yields extremely delicate results, and in operating with care the slightest variation in nature may be reproduced with extraordinary fidelity.—Phar. Jour. and Trans., July 21, 1883, 44-48; from *Moniteur Scientifique*.

Essential Oils—Detection of Alcohol.—Theodore Salzer reviews the methods heretofore proposed for detecting alcohol in essential oils, and finds that a combination of the distillation and the fuchsin process is the most sensitive.

He proceeds as follows:

A little of the essential oil is poured into a dry test-tube, taking care not to wet it in its upper portion, and a few fragments of fuchsin are then sprinkled upon the middle and upper inside surface of the test-tube. On heating, no change will be observed, if alcohol was absent. But if the oil contained even as little as one-tenth of one per cent. of alcohol, the ascending vapor of the latter will cause each particle of fuchsin to be surrounded by a red stain, either at once or after setting the test-tube aside for a short time. It is easy to recognize by this test the presence of one milligramme of alcohol in one gramme of the oil.

The author, in quoting this test, applies it specifically to oil of lemon, and attaches the remark that the method will undoubtedly be applicable to other essential oils, or to the detection of alcohol in other liquids which do not of themselves exert any solvent action upon fuchsin.—Amer. Drugg., May 1884, 94, from *Pharm. Zeitung*.

Volatile Oil of Thuja Occidentalis—Character and Composition.—According to the experiments of Schweizer (1844) the volatile oil of arbor vitæ is composed of two oxygenated oils, the precise characters of which were, however, not determined. Mr. E. John has now undertaken the determination of its chemical composition, and has obtained results which differ from those of Schweizer. The oil, freshly prepared, was pale greenish-yellow, had a camphoraceous odor, and a sp. gr. of 0.918 at

15°. Omitting the details of the author's experiments, his results may be stated as follows:

Thuja oil is a mixture of about 10 per cent. of a right-rotatory terpen, $C_{10}H_{16}$, boiling at 159°–160°; of a left rotatory *thujol*, $C_{10}H_{16}O$, boiling at 195°–197°; and of right-rotatory *thujol*, $C_{10}H_{16}O$, boiling at 197°–199°. It contains also traces of acetic and formic ethers. The relative proportion of the right and left-rotatory thujols can only be approximated, the left-rotatory portion amounting to probably 60–70 per cent. No difference was found in the composition of the oil distilled from the leaves collected in May, June and November of the same year.—Arch. d. Pharm., Oct. 1883, 748–754.

Volatile Oil of Blumea Lacera, D. C.—Characters.—Prof. W. Dy-mock draws attention to volatile oil of *Blumea lacera*, D. C., a plant which abounds in India during cold weather on waste grounds and in fields after harvesting the rice crop. One hundred and fifty pounds of the fresh herb in flower, submitted to distillation with water in the usual manner, yielded about 2 ounces of volatile oil of a light yellow color. It has a sp. gr. of 0.9144 at 80° F., and an extraordinary rotating power, 1 mm. turning the ray 66° to the left. The *Blumea* has a powerful cam-phoraceous odor, and is used by the natives of the Concan, near Bom-bay, to drive away fleas and other insects. The

Volatile Oil of Sphaeranthus Indicus, a plant which abounds in the same places along with the *Blumea*, has also been prepared by the author. One hundred and fifty pounds of the fresh herb yielded by the usual method of distillation a very deep cherry-colored, viscid essential oil, very soluble in water, and clinging to the sides of the vessel, so that only half an ounce could be collected. This oil does not appear to have any rotatory power, but it is difficult to examine on account of its opacity. The plant has a rose-like odor, and is a well-known Indian medicine, under the names of *Mündi*, *Gorakhmündi*, *Mundilika*, *Murmuria*, and *Kottak-karandai*, and is reported to be a general tonic, deobstruent, alterative and aphrodisiac. The distilled water and the root are recom-mended for use.—Phar. Jour. and Trans., June 7, 1884, 985.

Eucalyptus Oil—Substitution.—The demand for eucalyptus oil and eucalyptol, based on the reputation of the products obtained from the leaves of *Eucalyptus globulus*, has brought into commerce oils obtained from other species, which are said not to possess the same medicinal properties. However this may be, as there is a difference in their money value, it may be useful to quote from Messrs. E. Merck's circular the characters in which an oil that appears to be known in the German market as "*Oleum Eucalypti Australe*" differs from the genuine product from *E. globulus* leaves. The genuine oil has a weak dextro-rotatory ac-tion, forms a clear solution in 90 per cent. alcohol in all proportions, does not puff when treated with iodine, turns yellowish in contact with

sodium, and has a specific gravity of from 0.900 to 0.925, according as it is distilled from old or fresh leaves. The "australe" oil is strongly lævo-rotatory, only slightly soluble in 90 per cent. alcohol, puffs with iodine, is colored red on standing with sodium, and has a specific gravity not higher than 0.860 to 0.870. The characters for *E. globulus* oil answer for eucalyptol. The "eucalyptol puriss." has a boiling point between 170° and 173° C., a specific gravity of 0.910 to 0.920 at 15° C., and is as clear as water.—Amer. Drug., June 1884, 105, from Phar. Jour., March 20th.

Oil of Rose—Test of Purity.—Gmeiner gives the following test: Put one drop of the oil of rose into a dry test-tube, and add four drops of concentrated sulphuric acid. A perceptible rise of temperature takes place and the mixture must be allowed to stand until it becomes cool. Two grams (thirty-one grains) of absolute alcohol are then to be added, and the mixture well shaken. When the oil is pure, the mixture will be slightly opalescent, and, on heating, it will turn yellowish brown; this color will persist on cooling the solution. When the oil has been mixed with geranium, pelargonium, or palm-rose oils, the solution will be turbid, and an insoluble precipitate will soon form. Pure rose oil retains its characteristic odor when subjected to this test, but the mixture with these other oils evolves unpleasant odors.

When fatty oils, such as sesame, almond, etc., are used as adulterants, the usual test made by placing a drop on white paper and heating over an alcohol flame shows their presence in the greasy stain which remains. Pure rose oil is entirely volatile.—New Rem., July 1883, 210.

Oil of Patchouly—Characters of Stearopten.—Mr. Henry C. C. Maisch describes patchouly camphor (a homologue of borneol), as obtained from the oil, to consist of pieces of various size and form, mostly belonging to the hexagonal class of crystals. The color ranged from light yellow, probably from adhering or enclosed oil, to colorless.

In order to purify the camphor, it was dissolved in alcohol. This solution did not crystallize although evaporated to a syrupy consistency. The alcohol was completely driven off, and the residue dissolved in ether, from which solution it deposited after several times recrystallizing in colorless truncated hexagonal prismatic crystals.

The fusing points of both the crude and the recrystallized camphor were determined. A small quantity was put on some mercury in a beaker glass in which a thermometer was suspended, the mercury covering the bulb. A slow heat was then applied, the mercury in the thermometer rising slowly. The melting point of the recrystallized camphor was found between 55° and 56° C., coming near that determined by Gal in 1869 ("Compt. Rend.," lxxviii, 406), who gives it as 54°—55° C., while another author, de Montgolfier ("Ber. Deutsch. Chem. Ges.," 1877, 374), gives it as 59° C. The melting point of the crude camphor, deter-

mined upon mercury as stated above, was found between 57° — 58°C. , or about 2°C. higher than that of the recrystallized. The latter again solidified when cooled to between 48° and 49°C. , but the congealing point for the crude camphor is between 54° and 55°C. The boiling point determined by Gal, is given at 296°C. , the specific gravity as 1.051 at 4.5°C. , and the vapor density as 8.00 at 324°C. —Amer. Jour. Phar., Feb. 1884, p. 84.

Oil of Cloves—Sophistication.—Mr. G. Spencer, struck with the queer coloration produced by a sample of oil of cloves with ferric chloride, subjected it to nearer examination. He found it to be yellowish in color, of very weak aromatic taste, with odor exactly that of true oil of cloves. The spec. gr. was 1.02. When exposed to bromine vapor a deep black was produced, but no blue or violet. With ferric chloride a green coloration took place, with perhaps a trace of blue at the line of juncture produced by carefully pouring the “oil of cloves” into a solution of ferric chloride in alcohol, but which entirely disappeared on shaking. By distilling a portion and carefully treating the distillate with KHO, and afterwards with argentic nitrate, the latter was reduced and a resplendent mirror formed, proving the presence of a formate. That left in the retort was of a dark brown color, treacly appearance, and a peculiar faint unpleasant odor. This treated with Fe_2Cl_6 gave a much deeper green than the “oil of cloves.” Treated with KHO it was only partially saponifiable, leaving a pinkish-buff deposit, but the odor of cloves to large extent was restored.

It seems to be a mixture of genuine oil of cloves, with a compound belonging to the creasol class, as the latter gives the same coloration with Fe_2Cl_6 .—Amer. Jour. Phar., Dec. 1883, 611, from Phar. Jour. Trans., Sept. 1883, 184.

Essential Oils of Cinnamon and Cassia—Differences.—Mr. S. H. Jackson has made a second report to the British Pharmaceutical Conference on “The differences between the essential oils of cinnamon and cassia.” In his previous report (see Proceedings, 1883, 221), Mr. Jackson dealt chiefly with the physical behavior of the two oils, and stated his opinion that, whilst there was some difference in their specific gravity and refractory energy, there was nothing sufficiently characteristic to supply a satisfactory method of distinguishing between them. In the present report more particular attention is paid to the chemical aspect of the question. The most promising experiment consisted in a comparison of the behavior of the residues of the two oils after the removal of all the cinnamaldehyde by treatment with potassium bisulphite and ether; but although some slight differences have been noted they are not sufficiently definite to encourage further work in that direction.—Yearbook of Pharmacy, 1883, 464–467.

Oil of Cassia—Adulteration with Castor Oil, etc.—Mr. Wm. Saunders,

draws attention to an adulteration of oil of cassia with a mixture of about 4 parts of castor oil and 1 part of alcohol, one sample containing about 50%, the other about 30% of this mixture.—Pharm. Rec., Mar. 1, 1884, 101.

Oil of Caraway—Formation of a Phenol by Age.—Prof. F. A. Flückiger has contributed some additional information in reference to the characters of *carvol* and *carven*, which are in the main confirmatory of previous observations.

Carvol was found to have a sp. gr. of 0.060 at 18.75°, and boils at 224°. *Carven* was found to be a single hydrocarbon, boiling at 174°, and having a sp. gr. of 0.849 at 15°.

The statement in the Pharm. Germ., that oil of caraway, when diluted with an equal volume of alcohol, gives a violet or reddish color with ferric chloride, has lately been placed in doubt, inasmuch as several experiments have failed to obtain the reaction. The statement is based upon that made by the author in his "Pharmaceutische Chemie," p. 344, that oil of caraway contains a phenol. The author's recent investigations confirm the reaction in perfectly fresh oil of caraway or carvol, but five samples of the latter, when kept for about 8 months in well-stoppered, unopened bottles, in a cool dark closet, were found to have acquired a yellow color, and all of them gave the reaction with ferric chloride very promptly. The result shows that the phenol—if such it be—is formed in the carvol after a short time. The carvol, so changed, had increased in density, having now a sp. gr. of 0.970, and had thickened considerably. *Carven*, kept in the same manner, did not give the reaction with ferric chloride, and, whilst it had also thickened considerably, it remained colorless.

Carvol from Oil of Dill was found to give the same reaction as caraway-carvol, while *carvol from oil of crisped mint (Mentha crispa)* does not produce the red coloration with ferric chloride.—Arch. d. Pharm., May 1884, 361–305.

Carvol—Identity as Obtained from Different Oils.—Gladstone has shown that the carvol obtained from dill oil agrees in its principal physical properties with the carvol from caraway oil. Flückiger found that the carvol obtained from German mint oil (*Mentha crispa*) differed from the carvol from the other two sources in being strongly lævo-rotatory. Mr. A. Beyer has re-examined the carvol obtained from these three oils. To obtain it, the crude oils were distilled, the portion of the caraway oil distilling at 223°, those of the German mint oil at 215° to 230°, and 200° to 215° being employed. The crude dill oil was used without distillation. The hydrogen sulphide compounds, $(C_{10}H_{14}O)_2SH_2$, were first obtained in the crystalline state, and recrystallized from a mixture of three parts of chloroform and one of alcohol. The yield from caraway oil was 8 per cent. ; that from dill oil, 40 per cent., whilst the first frac-

tion of the mint oil yielded 50 per cent. ; the second fraction 30 per cent. All the hydrogen sulphide compounds melted at 187° . The specific rotatory power $[\alpha]_D$ at 20° of the compound from caraway oil was $+5.53$, from dill oil $+5.44$, from mint oil -5.55 . No crystallographic difference in the compounds could be detected. By the action of hydrogen sulphide on an alcoholic solution, all the three compounds were converted into the amorphous thiocarvol $(C_{10}H_{14}S)_2, SH_2$. The carvol obtained from all the hydrogen sulphide compounds agreed in boiling point and density ; and the specific rotatory power of carvol from caraway oil and dill oil was nearly the same, being dextro-rotatory ; the carvol from mint oil, however, was lævo-rotatory ($[\alpha]_D = -62.46$ at 2°).

The carvol from mint oil was distilled from metaphosphoric acid, the resulting *carvacrol* dissolved in potash solution, filtered, decomposed with sulphuric acid, and the carvacrol, $C_{10}H_{14}O$, was dried over calcium chloride. It solidified at -20° to a crystalline mass. The boiling point was 230° to 231° ; sp. gr. at 4° 0.075, specific rotatory power, 0. The crystalline barium salt of carvacrol-sulphonic acid was also prepared. It was thus shown that the carvacrol from lævo-rotatory carvol is identical with the carvacrol from dextro-rotatory carvol. A small quantity of a hydrocarbon boiling at 168° to 171° was obtained from the mint oil. It was lævo-rotatory, and appeared to be a terpene.—Amer. Jour. Phar., June 1884, 324 ; Jour. Chem. Soc., March 1884, p. 331 ; Arch. Phar. [3], vol. 21.

Menthol.—Use for making *Neuralgia Pencils*, which see under “Pharmacy, p. 114.”

Thymol—*New Reaction*.—Prof. J. E. Eykman draws attention to the following new reaction of thymol, whereby, also, it may be distinguished from phenol :—If a small crystal of thymol is dissolved in about 1 cubic centimeter of glacial acetic acid, and this solution mixed with about one-fifth its volume (5 to 6 drops) of concentrated sulphuric acid, a fine blue color is produced by allowing one drop of nitric acid to flow down to the bottom of the test-tube. On shaking, the whole liquid acquires this blue color. In presence of not too small a quantity of thymol, the liquid appears dichroic, being red by transmitted, and dark blue by reflected light.

Phenol differs from thymol, in this reaction, by causing the appearance of a fine violet-red color.

Salicylic acid, menthol, camphol, and borneol give no color-reaction under the above conditions.—Amer. Drugg., May 1884, 85.

Oil of Gaultheria—*Composition*.—Mr. Harlan P. Pettigrew has examined two different specimens of oil of gaultheria with a view to establish their composition. One was obtained by Prof. Maisch from Messrs. Underhill, Concord, N. H., and was distilled by them ; the other was obtained

directly from a distiller in Ellenville, N. Y., and both were guaranteed to be absolutely pure. These oils, when received, had already acquired a very slight reddish tinge, but upon re-distillation were obtained as bright, colorless and quite highly refractive liquids, having the specific gravity 1.17, both corresponding in this respect with the specific gravity of oil of wintergreen as determined by Procter.

The oils were treated separately, 190 grams being operated upon in each case. The plan followed in the investigation of this oil was the same as that adopted in the analysis of the oil of birch ("Amer. Jour. Phar.," 1883, p. 385), namely, saponification by treatment with a concentrated solution of potassium hydrate and boiling over a sand-bath in a flask fitted with an inverted condenser. After complete decomposition of the oil, the contents of the flask were submitted to distillation upon a sand-bath until the residue remaining in the flask was nearly dry. The distillate thus obtained presented a milky appearance, and globules of a yellowish oily substance were seen floating upon the surface. This is one striking difference between this oil and the oil of birch, as the corresponding distillate obtained from the latter was perfectly clear and transparent. The distillate was then agitated in the flask in which it was collected, with several successive portions of ether, and the ethereal solutions were carefully separated from the aqueous liquid, and the ether recovered by distillation upon a water-bath. The residue remaining in the flask then consisted (besides a few drops of water) of a yellowish oily substance, which was lighter than water and possessed a very strong peculiar odor, entirely different from that of the oil of birch or wintergreen. The terpene was then weighed without any attempt being made to purify it, as the amount was small. This determination was only approximate, yet the amount of terpene found amounted to but 0.3 per cent. of the weight of the oil.

The aqueous liquid which remained after extracting the terpene by agitation with ether, and which contained the methyl alcohol, was perfectly clear and transparent, and the alcohol, which was obtained by repeated distillation of the liquid from a water-bath, collecting only the lighter portions which passed over first, and further rectifying these by distilling from caustic lime, possessed the same odor, and was of the same specific gravity and boiling point as methyl alcohol.

The salicylic acid was obtained by making an aqueous solution of the salicylate of potassium, which remained in the flask after the first distillation, and decomposing this by the addition of a slight excess of hydrochloric acid, the chloride of potassium formed remaining in solution, while the salicylic acid formed as a dense white precipitate which, after washing with water and drying, was obtained pure by crystallizing from hot petroleum benzin.

Both specimens of oil examined yielded about the same amount of ter-

pene, but as a portion of one of them was accidentally lost, no attempt was made to weigh the small amount remaining.

These results show that oil of gaultheria sp. gr. 1.17 does not contain 10 per cent. of a terpene; for, if it did, the specific gravity of the oil would necessarily be very much lower than that of the oil of birch, in which the absence of a terpene has been conclusively proved.

Whether the oil of gaultheria which has been distilled in the spring or summer contains more of the terpene than that distilled in the fall, is not known; but from results obtained by experiments made upon a specimen which was distilled in the spring, it seems that there is a difference, as this oil was found to have a specific gravity of but 1.0318, and the absence of alcohol was shown upon application of several of the tests for that substance.

The results of the author's investigations are briefly summarized as follows:

I. Oil of birch is not identical with oil of gaultheria, in that it consists entirely of salicylate of methyl, and contains no terpene.

II. Oil of gaultheria, sp. gr. 1.17, does not contain ten per cent., but only a very small amount, of terpene, to the presence of which is due the slight difference in odor and specific gravity between the two oils.—*Amer. Jour. Phar.*, May 1884, 265-268.

Oil of Birch (Betula lenta, Lin.)—Chemical Composition.—Mr. H. P. Pettigrew has examined a sample of oil of birch, of undoubted purity, and summarizes his results as follows:

I. The volatile oil of birch is not identical with the oil of gaultheria, in that it consists entirely of salicylate of methyl, and contains no terpene.

II. The specific gravity of oil of gaultheria is not 1.180, as stated in the United States Pharmacopœia, but 1.0318; the former being the specific gravity of oil of birch, which, as is known, is often indiscriminately sold and employed as oil of gaultheria.

The oil of birch when freshly distilled is a bright and colorless liquid, of considerable refractive power; it possesses a very agreeable and fragrant odor, closely resembling that of gaultheria, although a difference can be perceived when the two oils are compared. With age, the oil acquires a reddish color, of which, however, it is deprived by distillation. It has a specific gravity of 1.180 at 15°C. (59°F.), and its boiling point is constant at 218°C. (424.4°F.)—*Amer. Jour. Pharm.*, Aug. 1883, 385-387.

Oleum Betulae lentæ—Composition.—In a former paper (see Proceedings 1883, 397-399) Mr. Geo. W. Kennedy had expressed the opinion that oil of birch, when properly prepared, is identical in composition with oil of wintergreen, notwithstanding that Mr. Pettigrew (in above) found it to be devoid of the hydrocarbon peculiar to the latter. Inquiries

and experiments since made by Mr. Kennedy seem to prove the correctness of Mr. Pettigrew's statement, samples of both fresh and of one-year-old oil—the former, the product of 600 lbs. of birchwood, having been found to be devoid of the hydrocarbon, and composed of nearly pure salicylate of methyl. In reference to a suggestion, made by Prof. Maisch, that the absence of hydrocarbon oil might be due to the circumstance that by the crude method of manufacture the so-called "light oil" accumulating upon the surface of the aqueous distillate is usually rejected. Mr. Kennedy observes that this is a mixture of water and oil of birch, and that it also is devoid of the peculiar hydrocarbon.—Amer. Jour. Phar., Feb. 1884, 85–88.

Oil of Gaultheria—Preparation in Luzerne Co., Pa.—Mr. Isaac Edward Leonard states that oil of wintergreen was first made in Luzerne county, Pa., in 1863, and that it has since been distilled in great quantities. The entire overground portion of the plant is employed, and it gives the greatest yield during the months of July and August. The author gives the following description of the process:

The still is generally a wooden box, about eight feet long, four feet wide, four feet high, with a copper bottom and stayed with bolts. The head of the still is copper, and connecting with this is a square or circular worm of the same material or of tin, placed in a barrel. The still being filled with wintergreen to within about twelve inches of the top, a sufficient quantity of water is added, and this is allowed to macerate from ten to twelve hours. The fire being started, the distillation commences and continues for about eight hours; but during the first two or three hours, ninety per cent. of the oil has passed over. For collecting the distillate, most of the stillers use a wide-mouthed bottle or fruit jar, fitted with a large cork having two holes. A small tin or glass funnel is put into one of the holes, so that the beak of the funnel is below the shoulder of the receiving vessel, and connected with the other hole is a suitable pipe forming an egress. The distillate passes into the receiving vessel through the funnel. It is here that the oil and the water separate, the oil going to the bottom, and the water being lighter and in excess passes through the egress pipe into a larger receptacle, where it is reserved for a subsequent operation (cohobation).

Occasionally the oil is very highly colored. The author has found several samples to contain traces of iron, which is due to the oxidation of the tin worm or can with which the oil comes in contact. Tin worms are used on account of their cheapness, but will only last about two weeks before they undergo oxidation.

The wholesale dealers that handle the oil in large quantities have three ways of "cleaning" it—re-distillation, filtration, and decolorization. The first two processes are easily understood, while the decolorization seems a difficult one, but is much easier than either of the others. The

oil to be decolorized is put into a bottle, and crystals of citric acid are added, and the whole allowed to stand, agitating occasionally, until the oil is colorless, or nearly so.

On experimenting with nine quarts of wintergreen fruit, the author found it contained one and one-half drachms of oil. In experimental distillation he found that the lower specific gravity is due to the separating of the oil from the water too quickly, and that the higher specific gravity is obtained by letting the distillate stand from twenty-four to forty-eight hours before separating the oil from the water.—*Amer. Jour. Phar.*, May 1884, 264-265.

Oleum Gaultheriæ—Value as a Remedy in Rheumatism.—At the New York Medical and Surgical Society, Dr. Flint stated that the results of trial made of this substance in thirteen cases of rheumatism at the Bellevue hospital served to show rather better results than those which are ordinarily obtained from salicylic acid. The oil of wintergreen was administered several times a day in ten-drop doses in flax-seed tea, which renders it less disagreeable to the taste and to the stomach. In some of the cases the alkaline treatment was employed at the same time. Dr. Ball stated that Dr. Kinnicutt had used the *oil of gaultheria* in a number of cases of acute rheumatism, with even better results than those mentioned by Dr. Flint. It was administered in milk, and was less disagreeable when so taken than salicylic acid or salicylate of sodium.—*New York Medical Journal*, June 30, 1883; *Amer. Jour. Phar.*, Dec. 1883, 610.

Oleum Rusci—Commercial Quality, etc.—Mr. Peter McEwan discusses the character of "oleum rusci" of British commerce, and expresses the belief that the unsatisfactory remedial value observed by several eminent dermatologists is attributable to the inferior character of the article employed. A specimen of genuine "ol. rusci," brought from Russia by Mr. Greenish, is described by Mr. Holmes as "a black empyreumatic fluid resembling in odor the liquid known as 'essence of smoke,' used for curing hams; after a mere trace of it has been rubbed on the hands, an odor like Russia leather is perceptible. The fluid, when caused to cover the side of the bottle in thin layer, is black with a brown tinge." According to Mr. Symes, there is a brown oil of birch (ol. rusci) which he believes to be the dark oil re-distilled. This brown oil, Mr. McEwan observes, is readily procurable, and if the demand were made for the genuine (dark? Rep.) oil, there would be no difficulty of obtaining it. That there are inferior grades of the oil in the market becomes evident from the following description of four commercial samples:

No. 1. Red-brown "re-distilled oil," sp. gr. 0.941. Exposed for fifteen minutes on a water-bath it was reduced to half its original bulk. Residue resembled Mr. Greenish's specimen; betulin odor intensified, but more pyroligneous than the veritable specimen.

No. 2. Red-brown "re-distilled oil," sp. gr. .876. (This oil is more fragrant than the genuine or No. 1, and suggests "doctoring.") On a water bath, the greater part volatilized within ten minutes, leaving a small residue of an oily nature and strong pyroligneous odor.

No. 3. A thick tar, black and bituminous. Odor somewhat like huile de cade. This was not examined, Hager stating that very thick varieties should be rejected.

No. 4. An amber-colored oil, sp. gr. 0.891. Odor like that of common spirit of tar (ol. picis rect.). On the water bath a small quantity was vaporized within ten minutes, leaving a mere trace of resinous matter destitute of betulin odor.

Of these four specimens, No. 1 only compares favorably with Mr. Greenish's sample, and answers to the description of the re-distilled oil of the Dutch Society. The sp. gr. of Mr. Greenish's sample, roughly estimated on account of limited quantity, was 0.943.—Amer. Jour. Phar., Dec. 1883, 627-629, from Phar. Jour. Trans., Nov. 17, 1883.

Oils of Bitter Almond and Cherry Laurel—Removal of Prussic Acid.—Mr. Rudolph Eck recommends the following process and manipulation for the removal of the prussic acid from the oils of bitter almond and cherry laurel, the operation being accompanied by a loss of about 36% of the crude oil: Ten parts of crude oil are mixed with 6 parts of slaked lime and 2 parts of ferrous sulphate, and a very powerful jet of steam, at a temperature of 140° C., is passed into the mixture.

The operation should be carried out as quickly as possible to reduce the products of decomposition to a minimum, for which reason the steam must be under pressure.—Pharm. Rec., April 15, 1884, 171, from Chemist and Druggist.

Mustard Oil—Percentage in the Seeds of the Cruciferae.—V. Dircks has determined the following percentage quantities of mustard oil; black mustard seed-cake, 1.39; rape seed from .018 to .037; rape-seed cake, .020 to .109; yellow mustard-seed-cake, .018; turnip seed, .038; seeds of *Sinapis arvensis*, .006; the quantity of oil decreases apparently with the age of the rape-seed-cake, but whether this is due to a decomposition of the ferment or of the myrosin, the author is still engaged in determining.—Amer. Jour. Phar., July 1883, 370, from Jour. Chem. Soc., 1883, p. 245, 246; Land. Vers. Stat., xxviii. 179-200.

Hedge Mustard Oil—Characters and Reactions.—For some years the fixed oil of the seeds of *Raphanus raphanistrum* or *Raphanistrum arvense* has been brought into European markets as a substitute for rape-seed oil, for which, when mixed with a proportion of the latter oil, it is sometimes offered. The siliquous fruit of the plant, which is now cultivated in Hungary, bears little seeds which contain 30 to 35 per cent. oil. This can be for the most part obtained by pressing. It has a dark olive-green color, and an odor and taste very similar to rape-seed oil; its density and

faculty for saponification with alkali is also nearly the same, so that it is difficult to recognize it in a mixture of the two oils. Mr. E. Valenta has now experimented to determine the points of difference, and he finds that by acting upon them with acids of different strengths, or with certain oxidizing agents, various colors are produced by both oils, by the shade and intensity of which they can be pretty well distinguished. Most characteristic for hedge-mustard oil appears to be the following reaction: About 5 grams of the oil are saponified with hydrate of potassium and spirit with warming, and the soap thus obtained is filtered from the unchanged oil, which is golden yellow and almost odorless and tasteless. The concentrated filtrate, on adding hydrochloric acid to strongly acid reaction, assumes a distinct green color if a somewhat large portion of hedge-mustard oil be present,—Phar. Jour. and Trans., Aug. 11, 1883, 110; Dingl. Polyt. Jour., 247, No. 1.

ALCOHOLS.

Alcohol—Table of Percentage and Specific Gravity.—In a former paper (see Proceedings 1883, 226) Mr. Gustavus Pile called attention to the alcohol tables of the Pharmacopœia of 1880, and showed that they differed materially from the scale of Tralles, and might mislead one in determining the value of alcoholic mixtures. Alcohol having a specific gravity of .8157 has been regarded as 95 per cent. for so long a time that it would seem to be difficult to interpret it in any other way, but by the adoption of the tables of Hehner, such will be the case, and 95 per cent. will have a specific gravity of .8161, and so on.

The author, being convinced of the unfeasibility of displacing the scale of Tralles in this country, has given considerable time to preparing very complete tables from that scale, and after the same extended form as those published in the Pharmacopœia. They indicate for each degree of specific gravity, the percentage of absolute alcohol, both by weight and volume, from water having a specific gravity of .9991 at 60° Fahr., to absolute alcohol of .7939 at the same temperature. These tables will be found to meet every requirement, and at the same time, the author states, are free from the inaccuracies that exist in those before noticed.—See Amer. Jour. Phar., Feb. 1884, 71–83.

Alcohol—Criticism on Hehner's and Pile's Tables.—Dr. A. B. Lyons, whilst admitting the value of the tables compiled by Hehner and by Pile, draws attention to errors in both in a lengthy paper, which see in Amer. Jour. Phar., May 1884, 251–256.

Alcohol.—Detection in *Essential Oils*, which see on page 252.

Ether—Simple Method of Redistillation.—Dr. Adolph Tscheppe recommends the following method for redistilling ether:

Take two ordinary 5-pint packing bottles, fit them with sound, conical perforated corks, and connect them together by means of a tin pipe

about two feet long. Into one of the bottles put some pieces of caustic lime and fill it to two-thirds with washed ether. Into the other pour about two drachms of ether and evaporate these by putting the bottle into warm water. When the air is expelled and the ether in the latter has just been evaporated, connect the bottles by means of the tin pipe, put the first bottle (containing the ether) into a vessel of warm water, and the second empty bottle into ice-water, whereupon the ether will rapidly distil over, and may thus be obtained of a low specific gravity; toward the end, the distillation is interrupted, when the bottles may be cooled off by placing them in cold water, emptied, and then again charged as before. The more perfect a vacuum is produced in the bottles, the lower will be the temperature at which the ether distils over, and the smaller will be the difference between the temperature at which the ether will boil in one bottle, and that at which it will be condensed in the other. It is not advisable to use a glass tube instead of a tin pipe, as the former easily breaks. The stoppers [and also the inside necks of the bottles] must be conical to prevent the pressure of the external air pushing them into the bottles.—Amer. Drugg., Feb. 1884, 24.

Ether—Products of its Slow Combination.—When the vapors of ether mixed with air pass over a strip of glowing platinum, it continues to glow, and the slow oxidation produces a mixture of formic and acetic acids with aldehyde, acetal, and methyl aldehyde. Legler has investigated this product and succeeded in isolating another new substance. From the slow oxidation of 150 or 200 cc. ether, he obtained 25 or 30 cc. (1 ounce) of a clear liquid, with a sour smell, resembling aldehyde. Upon cooling this in a desiccator, the new substance crystallized as rhombic prisms. It contains 26.44 per cent. of carbon to 6.42 of hydrogen, which points to the empirical formula $C_{11}H_{22}O_{21}$. It is a peculiar fact worthy of note, that when treated with ammonia and then acidified, it exhibits the same reaction exactly as peroxide of hydrogen. Legler is engaged in investigating the constitution of this new substance.—New Rem., Oct. 1883, 299, from Am. Chem.

Ferric Ethylate—Formation, etc.—Mr. E. Grimaux states that when 1 mol. of ferric chloride in alcoholic solution is mixed with 6 mols. of sodium ethylate, sodium chloride is precipitated, and a deep red-brown limpid liquid is obtained, which is free from chlorine, but contains all the iron in solution as ferric ethylate. The alcohol can be distilled off, and the ferric ethylate is left as a black pasty mass, soluble in absolute alcohol, benzene, chloroform, ether, petroleum, and methyl alcohol. If, however, this residue is heated in a vacuum so as to expel the last traces of the solvent, the small quantity of water present almost completely decomposes the ethylate, and ferric hydroxide separates out. If the operations of filtration, etc., have been conducted in dry air, the ethylate is not completely decomposed. An alcoholic solution of ferric ethylate

is not precipitated by a current of dry ammonia, but with dry carbonic anhydride it yields a brown precipitate. Dry hydrogen sulphide reduces it to a ferrous salt, and potassium ferrocyanide precipitates ferric hydroxide.

The action of water varies with the proportion in which it is present. If the alcoholic solution is exposed to a moist atmosphere, or is mixed with a small quantity of water, ferric hydrate is deposited as a jelly. If, however, the alcoholic solution of ferric ethylate is poured into an excess of water, limpid liquids are obtained which have the properties of the solutions of colloidal ferric hydroxide described by Graham. They coagulate spontaneously after some time, and are coagulated by addition of various substances, such as carbonic anhydride, sulphuric acid, tartaric acid, potassium chloride, sodium chloride, river water, etc. Acetic, nitric and hydrochloric acids, and ammonia, have no effect. Hydrogen sulphide produces a black precipitate.—*Amer. Jour. Phar.*, June 1884, 323-324; *Jour. Chem. Soc.*, May 1884, 573; *Comp. Rend.*, vol. 98.

Chloral Hydrate—Application as a Test for Sulphides and for Ammonia.—While engaged in verifying the reactions of chloral hydrate, Prof. Chas. O. Curtman found that one of the reactions can be modified so as to detect small quantities of sulphuretted hydrogen and of soluble sulphides, and also *minute quantities of ammonia*.

The reaction for chloral (given in the U. S. P.) is as follows: When a small quantity of aqueous solution of chloral hydrate is mixed with ammonium sulphide, a red-brown color is communicated to the solution, which, on standing, becomes turbid, and finally deposits a brown precipitate. Addition of acetic acid hastens the precipitation, and develops a peculiar penetrating odor.

If ammonia water be added to aqueous solution of chloral, we get a reagent which detects sulphuretted hydrogen by the coloration communicated to solutions containing only a small quantity.

If, on the other hand, to a small quantity of chloral hydrate freshly prepared sulphuretted hydrogen water is added, a slight turbidity is occasioned, which does not interfere with the use of the reagent. A single drop of ammonia water in half a litre of distilled water gives, on addition of the sulphuretted chloral solution, a very distinct yellow color to the whole mass.—*New Rem.*, July 1883, 205.

Chloral.—Compound with *Quinine*, which see under "Organic Bases."

Chloral.—Compound with *Chinoline*, which see under "Alkaloids."

Paraldehyd—Value as a Hypnotic.—Experiments with this new hypnotic are reported so far from the hospitals of Milan, Breslau and Andernach; none from hospitals in the United States. It is administered in doses of 2-6 gm., preferably in a sweetened ten-per-cent. solution. Its immediate effect is to produce a perfectly natural sleep of two to six

hours' duration, from which the subject awakes without any sense of distress, headache, dullness, or nausea. Its signal advantage over chloral hydrate is that it does not weaken the heart's action, nor impede the respiration or circulation in any degree; nor does it establish the necessity for its continued use, thus forming a "habit."

The sole objection to paraldehyd seems to be that it gives an unpleasant odor to the breath, which not only is noticeable in the room, but remains for twenty-four hours.—*Amer. Jour. Phar.*, Dec. 1883, 629, from *Med. and Surg. Rep.*, Nov. 17, 1883.

Paraldehyde.—Methods of administration. See *Emulsion of Paraldehyde* under "Pharmacy, page 84."

Paraldehyde.—An antidote to *strychnia*, see under "Organic Bases."

Diethylacetal, and

Dimethylacetal.—*New Anæsthetics*.—Dr. Mering, at a meeting of German naturalists and physicians, reported his experiments with two new anæsthetics: *diethylacetal* and *dimethylacetal*. The former has a burning, pungent taste, the latter a disagreeable smell and taste. Both produce narcosis very rapidly in frogs and rabbits. There is slowing of the heart-beat, and finally weakening of the respiration. In inhalation they act much like chloroform. Mering gave the diethylacetal to some criminals and found that it acted very well, producing narcosis with no bad after-effects.—*Amer. Jour. Phar.*, July 1883, from *South. Med. Rec.*, 1883, p. 29.

Amylic Alcohol—Presence of Organic Bases in the Commercial Article.—L. Haitinger has found that commercial amylic alcohol usually contains organic bases, which may be detected and separated by shaking the alcohol with diluted hydrochloric acid, evaporating the solution and distilling the residue with solution of potash. The resulting distillate then has usually a strong alkaline reaction, and has been found to consist, in some cases, of pyridine (as shown by the peculiar odor and by the formation of a double salt of pyridine and platinum); in other cases, of a little pyridine and another case not further examined.

The quantity of these impurities never amounted to more than 0.1 per cent. Haitinger thinks that the bases are perhaps formed in consequence of a peculiar splitting up of the albuminoids, or through the nitrous "fermentation," whereby amyl nitrite is first formed, and from this, by elimination of water, pyridine.—*New Rem.*, Oct. 1883, 305, from *Nieuw Tijdsch. v. d. Pharm.*, from *Monatsschr. f. Chem.*

Carbolic Acid—Characters, Reactions, etc.—From the results of a series of experiments, W. Meyke arrives at the following conclusions: 1. Pure carbolic acid should be colorless, have the proper boiling-point, and be entirely volatilized by heat. 2. The congealing-point is of secondary importance. 3. Carbolic acid is colored red when kept in glass vessels

containing lead. 4. The best vessels for keeping carbolic acid are made of tinned sheet-iron.—Amer. Jour. Phar., Nov. 1883, 562, from Phar. Zeits. Russl., 1883, 425-432.

Carbolic Acid—Solubility, etc.—Dr. E. R. Squibb criticises the statement in the Pharmacopœia that “100 parts of the crystals are liquified by the addition of about 5 parts of water,” and that “this liquid is rendered turbid by the further addition of water until 2000 parts have been added, when a stable and clear solution is formed.” This is equivalent to saying that the crystallized acid will dissolve only about 5 per cent. of the water, and that water will dissolve only about 5 per cent. of the acid. However true this may have been for the mixture of phenols sold some years ago as carbolic acid, the true carbolic acid of to-day differs from those phenols or their mixtures very materially. The author finds, and gives experimental data in support, that true carbolic acid is capable of holding in solution from 26 to 27.18 per cent. of water at 68°F; and that in its turn, is capable of holding 6 per cent. of carbolic acid in solution; such carbolic acid being free from creasote odor, and congealing at 38°C. (=100.4°F). The author also finds the chloroform test to be inaccurate. When the test was applied to a saturated solution of carbolic acid in water known to contain 6 per cent. of the acid, the chloroform increased only to an extent indicating 5 per cent.; while, on the other hand, when applied to carbolic acid known to contain 27.18 per cent. of water, the test only indicated the presence of 20 per cent. or say 73.5 per cent. of the water actually present.—Drugg. Circ., Sept. 1883, 131, from “Ephemeris.”

Carbolic Acid—Cause of Reddening.—A correspondent of the “Pharm. Ztg.,” who has had an experience of many years in handling large quantities of carbolic acid, gives it as his opinion that reddened carbolic acid has acquired its color from the defective spots in the tin coating of the iron cans in which it was originally contained, thereby taking up some of the exposed iron.—New Rem.. Dec. 1883, 366.

Carbolic Acid—Cause of Reddening.—According to the observations of Mr. Ebell, the crude crystalline carbolic acid contains substances which are colorless when pure, but some of which are changed by the action of the air and heat, and still more by light, into non-volatile bodies, partly of a red and partly of a yellow color. During recrystallization, their substance remains in the residuary liquid. They are but slightly soluble in cold water insoluble in benzin, but are dissolved by water containing sulphuric or phosphoric acid. On redistilling such a crude acid, the red coloring substance passes over with the first, and the yellow coloring body with the last portion.—Amer. Drug., May 1884, 95, from Zeitschr. f. Anal. Chem.

Sulpho-carbolate of Sodium—Remedial Value.—This salt has acted ad-

mirably in cases of rheumatic fever. For adults, Dr. Greenway, M. R. C. S., Plymouth, prescribes 15 grains every six hours in \mathfrak{z} iss of water. Ordinary precautions of administering an occasional aperient, placing the patient between blankets, and keeping him on milk diet must not be neglected.—Amer. Jour. Phar., Nov. 1883, 562.

Sulpho-carbolate of Sodium—Doses.—This salt, in thirty-grain doses, given after meals, is recommended in flatulent dyspepsia; also, in ten-grain doses, for nausea and vomiting, particularly in pregnancy.—Louisville Med. News; Amer. Jour. Phar., Jan. 1884, 42.

Trichlorophenol—Preparation and Uses as an Antiseptic.—Dr. Dianin proposes a new method for preparing this compound, namely, to add a saturated solution of chloride of lime to a concentrated aqueous solution of carbolic acid, and then to add hydrochloric acid, whereby a colorless, voluminous precipitate of trichlorophenol will be separated. This is soluble in 116 parts of water, easily in alcohol, ether, and carbon disulphide. The experiments quoted by the author show the substance to possess powerfully antiseptic properties, and appear to show that it is twenty-five times as energetic as carbolic acid. Weak solutions, containing only 0.02 per cent. are reported by the author as sufficiently active to arrest alcoholic fermentation, and to sensibly retard the latter in presence of only 0.007 per cent. The development of ammonia in urine is prevented by the addition of 0.25 per cent. of trichlorophenol. In cases of extensive gangrenous processes, this substance is a powerful antiseptic, “surpassing carbolic acid, thymol, salicylic acid, chloride of lime, magnesium salts,” etc. Further advantages of the substance are its property of suppressing bad odors, and the fact that even concentrated solutions of it do not irritate the tissues.—New Rem., Oct. 1883, 294, from Arch. d. Pharm.

Trichlorophenol—Antiseptic Value.—Dr. N. O. Yurinsky, of Alexander Town Hospital, St. Petersburg, reports four cases of erysipelas (three idiopathic, one traumatic) which he highly successfully treated by painting the affected parts with a solution in *glycerite* of *trichlorophenol* (5 to 10 per cent.). The painting was repeated twice daily; each time the parts were freshly covered with cotton-wool retained by means of a roller. In two of the cases, swelling, redness, tension and tenderness of the integuments disappeared after two paintings (on the second day of the treatment); in the remaining two patients, after six. In all the cases, the erysipelatous process did not spread after the first application. The temperature fell to standard in one of the cases on the second day of the treatment; in one, on the third; in the other patients, who suffered at the same time from relapsing fever, no change in the temperature was observed. The author eulogizes the powerful anti-fermentative and antiseptic properties of trichlorophenol, and emphatically invites all profes

sional brethren to give a more extensive trial to such a simple plan of the treatment of erysipelas described above.—Amer. Jour. Phar., Dec. 1883, 630, from The London Medical Record; Quart. Therap. Rev., July 1883.

Picric Acid—Estimation in Beer.—Mr. G. Christel reviews the principal reactions of trinitrophenol (picric acid), made with a view to its qualitative and quantitative estimation, and, among other processes for its detection and determination, gives the following for its detection in beer: 200 cc. of the beer are evaporated to a syrupy consistence on the water-bath, and then digested in a flask with 50 cc. of alcohol (99 per cent.), the mixture being allowed to stand for 24 hours, when it is filtered, and the residue washed with 31 cc. more alcohol. The mixed filtrates are evaporated to the consistence of a syrup, and acidified with two or three drops of dilute sulphuric acid. The mixture is then extracted with five or six times its volume of ether, the latter removed, the solution again acidulated and extracted with ether. The ethereal solutions are spontaneously evaporated, and the residue dissolved in 5 or 10 cc. of water, the solution filtered, neutralized with ammonia, and tested by known methods. For the estimation of picric acid, the author proposes a colorimetric method, based on the potassium cyanide reaction. The ethereal residue is diluted to 10 cc. with a little ammonia, 5 or 10 drops of a ten-per-cent. potassium cyanide solution added, and the liquid, after heating it to 80°, is diluted to 100 cc. with dilute ammonia. The color produced is compared with that given by a certain quantity of a standard solution of picric acid, 100 cc. of which contain 0.1 gram of pure picric acid, the operation being conducted in the same way.—Amer. Jour. Phar., April 1884, 212-214; Jour. Chem. Soc., Feb. 1884; Arch. Phar. (3), xxi, 190.

Picric Acid.—Preparation of Test Solution for *Glucose*, which see under "Carbohydrates."

Beech-Wood Creosote—Recognition.—Dr. H. Hager gives the following characters for the recognition of pure beech-wood creosote:

Pure beech-wood tar creosote is not soluble in double its volume of anhydrous glycerin, but forms therewith a milky white or whitish mixture, which ought not to be colored. Other creosotes dissolve in double their volume of glycerin. To detect phenol, 3 vols. of a 75 per cent. creosote are mixed with 1 vol. of the suspected creosote, and well shaken. On settling, there are formed two strata, a turbid one below and a lighter layer. The latter consists of the creosote which has given up its proportion of phenol to the lower stratum, its volume becoming smaller according to its proportion of phenol. In order fully to remove the latter (at least up to 98 per cent.) from the creosote, the upper layer is again shaken up with three times its volume of 75 per cent. of glycerin, as before. On shaking up with ammonia at 5 per cent., the phenol passes

into the latter, whilst the beech-tar creosote remains undissolved. If the sample is mixed with an equal volume of soda-lye at sp. gr. 1.334, it should form a clear yellow permanent liquid, a slight degree of heat being liberated. One vol. of beech-tar creosote dissolves completely and clearly in 2 vols. of petroleum benzin, and the solution should be almost colorless or yellowish. Creosote containing even 5 per cent. phenol or cresol gives a turbid mixture. The solution of the creosote in petroleum benzin is divided into three parts. The first is shaken up with an equal volume of liquid ammonia, the second with caustic soda-lye of sp. gr. 1.160. In neither should a dark coloration appear in the course of half an hour. The third portion is shaken up with an equal volume of baryta-water. No blue, violet, or red color should appear in either stratum of the liquid. Such colors would indicate tar-constituents, which should not be present in creosote. If 1 vol. creosote is shaken up with 2 vols. of a 15 to 18 per cent. ammonia, a genuine pure sample takes, at most, a lemon-yellow color in the course of half an hour, and the upper aqueous stratum is pale or yellowish. Equal volumes of creosote and collodion should form a mixture, which remains colorless for half an hour.—Pharm. Rec., Aug. 1, 1884, 280; from Zeitsch. f. Anal. Chem. and Chem. News.

Glycerin—Method of Estimating in Aqueous Solution.—Mr. Morawski gives the following method for estimating the proportion of glycerin in a mixture of glycerin and water. Heat two or three grams of the glycerin with oxide of lead at 130°C . until the weight of the lead oxide does not increase. Multiply the increase of weight of the lead oxide by 1.3429, and it will give the quantity of glycerin in the commercial product. The lead oxide combines with the glycerin, forming a compound $\text{C}_3\text{H}_5\text{PbO}_2$. The error will be within one per cent.—New Rem., Sept. 1883, 275, from L'Union Pharm.

Glycerin—Use as an Excipient in Ointments, etc.—The use of glycerin as a solvent, in the place of lard or oil, is opposed by Vigier on the ground that it does not penetrate the skin, and is, therefore, a poor excipient for drugs that are to be absorbed. For the same reason, it is especially applicable where the systematic effect is undesirable, as in the use of mercuric chloride as a parasiticide. True fatty substances are therefore required as vehicles for remedies that are to be used by inunction; while glycerin ointments may be employed where local effect only is sought.—Amer. Drugg., Jan. 1884, 13, Rundsch. Pharm., IX, 224.

Nitroglycerin—Physical Characters.—Dr. Matthew Hay communicates some observations on the physical characters of nitroglycerin, which are more precise than those to be met with in previous publications. Nitroglycerin is perfectly colorless. If colored, this is due to the imperfect removal of the acid, or to the use of soda, which decomposes it with the production of a reddish-brown color. It has no odor when cold, but a

sharp pungent odor when heated. Its taste is sweet, and not unlike that of glycerin, but is more pungent. 1 gram dissolves in about 800 cc. of water; in 3 to 4 cc. of soluble alcohol; in 10.5 cc. of rectified spirit (sp. gr. 0.846); in 1 cc. of methylic alcohol (sp. gr. 0.814); in 4 cc. of methylated spirit (sp. gr. 0.830); in 18 cc. of amylic alcohol; in every proportion in ether, chloroform, glacial acetic acid, and carbolic acid; in less than 1 cc. of benzol; in 120 cc. of bisulphide of carbon; and to a very limited extent, if at all in glycerin. Its aqueous and alcoholic solution appear to keep well.—Pharm. Jour. and Trans., July 7, 1883, 8, from "The Practitioner."

Boroglyceride—Preparation, etc.—Mr. Wm. S. Flint has made a number of experiments to determine the best method for its preparation, and found the following to give a very satisfactory, light-colored product.

The author heated 184 grammes of Bower's glycerin in a porcelain capsule to a temperature of 240° F., and added 124 grammes of Morson's crystallized boracic acid, in portions, with constant stirring. There was no effervescence, and when dissolved, a transparent, thick liquid was obtained, the weight of which was 270 grammes. Continuing the heat at the same temperature, with frequent stirring, steam was given off, and it became more fluid. As the combination became more perfect, a film was formed upon the surface; it became thicker, and when reduced to 200 grammes it was poured upon a sheet of tin, well oiled with vaselin, and allowed to cool. The whole operation required about four hours. When nearly cold, it was divided into squares with a large spatula, and when thoroughly cooled it was broken in pieces and quickly transferred to well stoppered vials. It readily absorbs water from the atmosphere, becoming sticky and greasy. A porcelain or porcelain-lined dish should be used in its preparation, as it is least affected by boracic acid at high temperatures.

This product was found to be readily soluble in hot water, less freely so in cold water. A white coating is formed upon the pieces during the solution in the latter, requiring agitation to hasten the solution. It is soluble in hot alcohol, and to a moderate degree in cold alcohol. It is insoluble in ether, but softens when allowed to stand in chloroform for some time. Heated upon a water-bath, it becomes fluid at about 212° F., and mixes with glycerin in all proportions, forming a transparent mixture.

Equal weights of glycerin and borate of sodium or borate of calcium, heated to 204° F., combine with effervescence without the evolution of irritating vapors, and require constant stirring to prevent burning upon the bottom of the capsule. They form compounds resembling boroglyceride, but absorb water more readily, and do not retain their shape when broken in pieces.—Amer. Drugg., Mar. 1884, 41.

FIXED OILS.



Fixed Oils—New Test.—Mr. Wm. Fox has contributed a paper in which he describes a new method of examining fixed oils for their purity. The method depends upon the fact that different fixed oils have been found by the author to absorb different quantities of oxygen gas. The process of the author consists in heating a weighed quantity (about 1 gm.) of the oil in a *sealed* glass tube having a capacity of about 100 cubic centimeters, with 0.5 gm. of precipitated oxide of lead, in an oil-bath for several hours to 220° F. A portion of the oxygen of the air inclosed in the tube will thereby be absorbed by the oil, and the amount absorbed may then be estimated by the decrease in the volume of the gas in the tube when it is opened under water or another suitable liquid; or the remaining gas may be measured, and the unabsorbed oxygen absorbed with pyrogallic acid and potash. The author gives a table showing the difference in the power of absorbing oxygen possessed by a few of the more important fixed oils, the figures given being the mean of a great number of experiments closely agreeing with each other, except in the case of linseed oil. He does not, however, speak very hopefully of the adoption of the method for commercial or pharmaceutical purposes, the determination requiring special attention to be paid to temperature and pressure, and the usual precautions when measuring gases have to be observed.—New Rem., Dec. 1883, 367; "The Analyst," July, 1883.

Fats—Chemical Examination.—Mr. Max Gröger, having subjected Hausmann's method of testing a mixture of neutral fats and fatty acids to a thorough study, and having succeeded in improving and simplifying the method, Mr. Karl Zulkowsky communicates Mr. Gröger's results, as follows:

The method is based on the fact that a fatty acid in alcoholic solution is instantly saponified by addition of an alcoholic solution of potash, while the saponification of a neutral fat requires protracted boiling.

If, therefore, the alcoholic solution of the mixture of fatty acids and neutral fats is mixed with a little phenolphthalein, and then titrated with caustic potash, the red color caused by the latter reagent disappears on stirring as long as free fatty acids are present. As soon as these are saturated, the red color remains. If now a known excess of caustic potash be added, and the mixture boiled for half an hour, the neutral fat is saponified. By titrating back with standard acid, the volume of the solution of potash consumed in the saponification is ascertained.

From the amount of standard alkali thus consumed in the saponification of the fatty acids and of the neutral fats, the respective amounts of these are calculated. It is even unnecessary to know the weight of the mixture of fatty acids and fats.

The study of the method has shown that it yields very accurate results, and that is indeed a real *mine* from which still other useful processes

may be derived from the technology of fats.—New Rem., Oct. 1883, 303, from Ber. d. Deutsch. Chem. Ges., 1883, 1140.

Oils and Fats—Coloration of Chlorophyll, etc.—See *Chlorophyll* under “Coloring Matters”

Lard—Preparation for Pharmaceutical Uses.—Dr. E. R. Squibb has found commercial lard to be entirely unreliable for pharmaceutical purposes, and therefore communicates the following process for preparing it from leaf fat: “Leaf lard,” so called, which is the harder fat from the omentum and around the kidneys, is bought fresh and in winter time only, is cut in small pieces and well washed with cold water and drained, and the water absorbed by cloths as far as practicable. It is then heated on a water or steam bath to about 40° to 50° C. (=104° to 122° F.) only, and the melted fat pressed or wrung out in cloths. This melted lard, run at once into tight tin vessels, is perfectly sweet and good, and in a cool place, well protected from the air, keeps sweet almost indefinitely.—Drugg. Cir., June 1884, 86, from “Ephemeris.”

Lard—Preparation for Pharmaceutical Uses.—Professor Redwood, after criticising the different methods proposed and in use for purifying lard for medicinal uses, observes that he has had occasion during the last two or three years to make many experiments on the rendering and purification of animal fat, and at the same time has been brought into communication with manufacturers of oleomargarin on the large scale; the result of which experience has been that he has lost faith in the efficacy of the B. P. process. He found that in the method now generally adopted by the manufacturers of oleomargarin, the use of water for the washing of the fat before melting it, is not only omitted but specially avoided. The parts of the process to which importance is attached are: first, the selection of fresh and perfectly sweet natural fat, which is hung up and freely exposed to air and light. It then becomes dried and freed from odor, which is present in the freshly slaughtered carcass. It is then carefully examined and adhering portions of flesh or membrane are as far as possible removed, after which it is cut up and passed through a machine in which it is mashed so as completely to break up the membranous vesicles in which the fat is enclosed. The magma then produced is put into a deep jacketed pan heated by warm water, and the fat is melted at a temperature not exceeding 130° F. If the flare has been very effectually mashed the fat may be easily melted away from the membranous matter at 120° F., or even below that, and no further continuance of the heat is required beyond what is necessary for affecting a separation of the melted fat from the membranous and other suspended matter. Complete separation of all suspended matter is obviously important, and filtration therefore seems desirable, where practicable. The author's experiments tend to indicate that this process is that best adapted for the preparation of lard in pharmacy, care being also necessary in the selection

of the flare, which should be selected from healthy and properly-fed animals.—Phar. Jour. and Trans., Nov. 10, 1883, 364, 365.

Stearate of Sodium—Preparation.—Mr. Reeb gives the following directions for preparing stearate of sodium: Dissolve 15 parts of stearic acid in 150 parts of benzol on a water-bath, and add a solution of 2 parts of caustic soda in 5 parts of water. On shaking a little, the stearate separates as a gelatinous mass that can be collected on a filter. A faultless opodeldoc soap is thus obtained, if the soda is free from lime.—Drug. Circ., Nov. 1883, 163, from Rundschau, Leitmeritz.

Soap—Analysis.—Mr. Alfred Smetham has read a very interesting paper before the Liverpool Chemists' Association (Nov. 8, 1883), in which the manufacture of soap, the raw material employed, and the commercial character of soap, are described. The author also communicated the method of analysis of commercial soaps, which has given good results in his hands, and which is both convenient and accurate.

The water is determined by drying in an air-bath a weighed portion of the soap at a temperature of 120° C. At this temperature the soap swells up, and the water is soon expelled without any loss of the fatty matters or danger of losing the substance. The weight is taken after about three hours, and subsequent weights are made at intervals of about an hour until the weight is constant.

To obtain the percentage of fatty acids, he finds it best to weigh out about 3 grams of the soap in a porcelain or platinum basin, including in the weight of the basin a small stirring rod about 3 inches long. The soap is then dissolved in a small quantity of water in the basin, and when *completely* dissolved, about 5 cc. of dilute sulphuric acid are added. This decomposes the soap, setting free the fatty acids and forming sulphate of soda. The solution is then gently warmed—preferably on a water-bath—until the whole of the fatty acids have risen. It is then allowed to cool, and the fatty matter will usually form a solid cake. If this does not occur, a weighed quantity of purified wax must be added, and the whole re-melted. When the cake is formed it is simply moved a little from the side, and the liquid from below, which should contain no fat, is poured off. The cake is re-melted with distilled water and allowed to settle as before. This is continued until the washings are free from acid. The cake is then melted in a water-oven and again allowed to cool, and the water which still adheres is removed by gently touching with filter paper, and the basin is again placed in the water-oven and weighed until the weight is constant. From the figures obtained the percentage of fatty and resinous acids is calculated.

The soda is determined by adding to the filtered solution from a given weight of soap, an excess of standard acid and titrating back the excess of acid by means of standard alkali, using cochineal as indicator.

The percentage of silicate is obtained from the silicic acid found. To

obtain this, he prefers to ignite about 2 grams of the soap in a platinum dish until the volatile matters are dispersed. After cooling, the ash is covered with a glass and treated with an excess of hydrochloric acid. It is then evaporated to dryness, taken up with dilute acid, well washed and then ignited and weighed.

These are the constituents which it is usually necessary to determine, but it is sometimes required to make a more complete analysis. When this is desired it is a good plan to dissolve the soap in alcohol and filter. By this means most of the adulterating materials are separated. The chlorine is best estimated after decomposing the soap with nitric acid and allowing the fat to solidify, as in the estimation of fatty acids, by precipitating with nitrate of silver and weighing the resulting chloride.

The percentage of free alkali is important. It can be obtained by precipitating the clear alcoholic solution with carbonic acid, but he prefers to titrate the solution with standard acid, using phenolphthalein as indicator. The results are good.

In making out the analysis of a soap it must be remembered that the fatty constituents actually exist as fatty anhydrides, and not as fatty acids; and if, therefore, we determine the whole of the constituents of a soap, and include the fatty matters as the estimated acids, we shall find that the figures will add up to about 103 per cent. This is due to the absorption of water by the fatty anhydrides in decomposition. The actual percentage of fatty acids should always be placed as a foot-note.

In making a choice of the soaps usually found in the market, it is difficult to know which to take as representative; but it will, perhaps, be sufficient to divide them into two classes—the pure and the silicated. The analyses given of the average qualities of these soaps show the following:

Soaps.	Fatty Acids.		Soda.		Hydrated Silicate of Soda.		Water.	
	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
Pure . . .	63.18	53.74	8.31	6.38	.	.	28.13	36.89
Silicated .	56.91	26.26	7.45	5.30	8.58	1.04	31.41	58.97

—Amer. Jour. Phar., March 1884, 141–146, from Phar. Jour. and Trans., Jan. 5, 1884, pp. 534–537.

Soaps—Value as a Vehicle for Medicine.—Dr. R. S. Christiani draws attention to the value of soap, both as a remedy by itself, and as a vehicle for more energetic agents in affections of the skin. By itself it causes a softening and soothing influence, exerts a healing effect in most cutaneous diseases, and from its softening properties it causes many medicinal substances that may be combined with it to act more certainly, and

with greater promptness, than perhaps any other vehicle that is at present known. The best medicinal soaps are those made from vegetable oils, such as olive, palm, and almond oil. Mutton tallow, and in some cases a little resin, will not injure its healing qualities. These materials must, of course, be the purest of their kind, and great skill must be exercised in the making, in order to insure the formation of a perfect soap. Some intelligence must also be exercised in reference to the compatibility of the medicinal agent, which is best combined by means of the mill, for it can be added without heat, while the perfume, if used, can be combined at the same time. The author enumerates a few of the remedial combinations, such as the juice of the lettuce and cucumber; benzin, tar, petrolatum, and carbolic acid; menthol and thymol, etc. Mucilage of tragacanth added to all soaps for medicinal purposes causes them to be more emollient.—*Amer. Drugg.*, Jan. 1884, 7-8, from *Oil Paint and Drug. Rep.*

Beech-nut Oil—Uses, etc.—The oil of beech kernels has lately been again drawn into use, in French practice, chiefly as a solvent for creasote (15 parts of creasote to 985 parts of the oil). As the amount of the oil annually produced is limited, adulterations of it are by no means uncommon. According to Henry Mayet ("Bulletin de Thér."), beech-nut oil is particularly distinguished by its fine, golden-yellow color, and the color-reactions produced by adding 10 parts of a mixture of equal parts of sulphuric and nitric acid to 10 parts of the oil. At the point of contact of the two liquids, a currant-red color appears in the case of beech-nut oil; the color is orange with oil of poppies, lemon-yellow with oil of sesame, or of peanuts; and no coloration is produced with olive oil. On shaking the mixture, it does not change with beech-nut oil, but with oil of poppies it becomes orange-yellow, and brown with oil of sesame or peanuts. On adding 1 part of sulphuric and 1 part of hydrochloric acid gradually to 5 parts of the oil, an olive-green color is produced with beech-nut or olive oil, a chestnut-brown color with oil of peanuts, and a dirty-gray color with oil of poppies or of sesame. Beech-nut oil has the specific gravity 0.9205-0.9207, and becomes solid when cooled to 17° C. (= 1.4° F.)—*New Rem.*, Aug. 1883, 243, from *Pharm. Zeit.*

Sesame Oil—Suitability for Pharmaceutical Purposes.—In a paper read before the British Pharmaceutical Conference, Mr. Michael Conroy expresses the opinion that sesame oil cannot replace olive oil for the chief pharmaceutical uses, since, from the large proportion of olein it contains, plasters made with it do not "set," whilst lime liniment made with it shows a tendency to separate. But in preparations where no chemical combination takes place, and where only a bland sweet oil possessing good keeping properties is required, perhaps no better could be chosen; and he thinks it might serve as a substitute for almond oil in the preparation of ointments.—*Yearbook of Pharmacy*, 1883, 537-539.

Mr. Thomas Maben read a paper on the same subject. His opinion of sesame oil is somewhat more favorable, since he thinks that it might not only take the place of olive or almond oil in the preparation of ointments,—except ung. hydrarg. nit.,—but that it could be made applicable to plasters by a modification of the proportions of the ingredients. Ibid. 539–543.

A New Vegetable Tallow, suitable for preparing ointments, etc., is obtained from several species of *Hopea*. See *Ebenacea* under “*Materia Medica*, p. 144.”

Cinchocerotin—*A New Constituent of Cinchona Bark*.—Dr. Kerner has discovered a new constituent in flat calisaya bark from South America, which he has named *cinchocerotin*. It was deposited in a crude condition in the copper tube used by him for cooling the alcoholic extraction of the bark dried with milk of lime, the brownish encrustation having been formed during a period of six to nine months. It is associated in this substance with a whitish yellow substance, which requires further examination.

Cinchocerotin forms white, very light, crystalline scales, which, when heated upon platinum-foil, burn without any remarkable odor. The melting point is at 130°C .; when more strongly heated, it partially sublimes with decomposition; if, however, carefully heated in a current of carbonic acid, it sublimes without decomposition. It dissolves readily in ether, chloroform and alcohol, but does not dissolve by boiling with water, hydrochloric, dilute sulphuric, and glacial acetic acids. By boiling with a solution of carbonate of sodium or caustic soda it is not attacked, and also not by alcoholic soda; with concentrated sulphuric acid it gives a reddish-brown solution. By the action of nitric acid it is converted into a yellow resinous-like body; and by the action of bromine a brown uncrystallizable substance was obtained. When melted with potassium hydrate cinchocerotin becomes yellow, but does not mix therewith, and when more strongly heated it volatilizes partially with decomposition.

The analysis of cinchocerotin afforded numbers corresponding to the formula $\text{C}_{27}\text{H}_{48}\text{O}_2$. By oxidation with potassium bichromate and sulphuric acid a green liquid and a green precipitate were obtained. In the liquid, by distillation, acetic and butyric acids were detected; from the green precipitate by solution in caustic soda and supersaturation with an acid, a yellow precipitate was obtained, which, when washed, and dissolved in alcohol, had an acid reaction, and afforded upon the evaporation of the solution, small wart-like crystals, which may be designated as *cinchocerotic acid*. After recrystallization the acid melted at 72°C ., and afforded upon analysis numbers corresponding to the empirical formula $\text{C}_{10}\text{H}_{22}\text{O}_3$.—Amer. Jour. Phar., July 1883, 357–358; from Arch. d. Phar., vol. 221, 1883, 279–283.

Sulpho-oleic Acid—Uses as a Solvent.—Dr. A. Mueller Jacobs draws attention to the compounds of sulpho-oleic acid with alkalies, and the uses to which they may be applied on account of their power to dissolve a great variety of substances. He has introduced sodium, potassium, and ammonium salts of sulpho-oleic and sulpho-ricinoleic acids, but finds the sodium and potassium salts to be the more useful, since the ammonium salts are liable to decomposition.

Those salts of the alkalies which are not entirely neutral do not form clear solutions with water; the latter also appear milky or opaque, if unaltered tri-glycerides (oils) are present. This milkiness or opacity, however, is removed instantly by a small quantity of water of ammonia.

When concentrated and in as pure a state as possible, the alkali-salts of sulpho-oleic or sulpho-ricinoleic acid, as well as the free sulpho-acids themselves, mix readily and completely, with a great variety of organic compounds, for instance with liquid hydrocarbons, particularly those of low boiling point, with chlorine, iodine, and bromine derivatives of the same, with ethers and alcohols (even the di-, tri-atomic, etc., ones), with organic sulphur compounds, such as carbon disulphide, oil of mustard, mercaptane, etc., and with all essential oils. They also dissolve varying quantities of sulphur, iodoform, solid hydrocarbons, such as naphthalin, naphthol, anthracene, and paraffin, the terpenes and camphenes. These liquid mixtures of sulpho-oleates and other bodies have the property of forming emulsions or even clear solutions with water. The limit of miscibility (in form of emulsion) or solubility varies considerably, and depends both on the degree of concentration of the sulpho-oleate serving as a menstruum, and on certain, little understood properties of the substances mixed with it. For instance, 100 parts of pure neutral sulpho-ricinoleate of sodium yield, with 50 parts of ether, an almost clear solution; so also with 30 parts of volatile oil of mustard, 30 parts of petroleum benzin, 100 parts of coal-tar benzol, 40 parts of carbon disulphide, etc., etc. Larger quantities of these substances yield permanent milky emulsions, foaming when diluted and shaken with water.

This peculiar behavior of the sulpho-oleates, and particularly the sulpho-ricinoleate of alkalies toward many otherwise insoluble or difficultly soluble substances, as well as their pronounced saponaceous character, and their great readiness of taking up and combining with liquids, renders them eminently suitable for various technical and medical uses. They will be found excellent solvents for substances, the employment of which, in a concentrated condition, is accompanied by certain untoward effects, or they may serve as vehicles in place of vaseline, oils, glycerin, etc., etc., in perfumery, soap-making, or in pharmacy.—*Amer. Druggist*, Feb. 1884, 22–23.

CARBOHYDRATES.

Cellulose—Fermentation.—Mr. H. Tappeiner has succeeded in causing cellulose to undergo fermentation, under the following conditions:

Finely divided cotton-wool or paper is introduced into a flask containing a neutral one-per-cent. solution of extract of meat. The vessel is heated at 110° , and when cold a small quantity of the contents of the pancreas is added. Fermentation begins in a few days. The gases evolved consist chiefly of marsh gas and carbonic anhydride. These two gases are in the ratio of 1 to 7.2 at the beginning of the process, but the carbonic acid afterwards diminishes to the ratio of 1 : 3.4.

The actual figures are :

	Commencement.	End.
CO ₂	} 85.48	76.98
SH ₂		
H	0.03	. .
CH ₄	11.86	23.01
N	2.73	. .

Acetic and isobutyric acids are the chief products of the fermentation, 5.5 grams of cotton-wool yielding 5.8 grams of volatile acids. Acetaldehyde is also formed. Cellulose undergoes similar fermentation in the first stomach of ruminants and in the alimentary canal of herbivora. When the preceding experiments are varied by rendering the meat extract feebly alkaline, by adding Nægeli's solution (potassium phosphate, 0.2 gram ; magnesium sulphate, 0.04 gram, and calcium chloride, 0.02 gram), or a solution containing, in addition to the above salts, 0.35 per cent. of ammonium acetate, 0.3 acetamide, or 0.6 asparagin, the following results were obtained :

	0.5 per cent. solution of meat extract.	Asparagin.	Acetamide.
CO ₂	} 55.39	86.47	78.14
SH ₂			
H	42.71	5.73	13.68
N	1.90	7.80	8.18

No difference could be detected in the bacteria in the two kinds of fermentation. In addition to aldehyde, isobutyric and acetic acids, a small quantity of ethyl-alcohol appears to be formed by the "hydrogen" fermentation of cellulose.

Alcohol, aldehyde, and acetic acid are produced during the fermentation of hay. The gases evolved contain CO₂ 51.15, H 44.58, CH₄ 0.9, N 4.18 per cent.—Amer. Jour. Phar., March 1884, 164-165: Jour. Chem. Soc., Dec. 1883; Berichte, xvi, 1734-1740.

Cellulose—Use as a Dressing.—Dr. Fischer, of Trieste, has made experiments with cellulose as a dressing to wounds, and has found it, when

moistened with warm water or some medicated solution, and afterwards covered with an impervious fabric, to be a most excellent application in all cases where heat and moisture appear to be indicated. Its chief advantages are: 1. It is absolutely free from substances capable of exciting putrefaction. 2. It has a very low specific gravity. 3. It produces neither eczema nor erythema upon the epidermis. 4. It retains moisture and heat perfectly for more than twenty-four hours. 5. It never adheres to granulating wounds on the surface of the skin. 6. It adapts itself perfectly to the outline of the place of application. 7. It is much cheaper than other materials heretofore used for similar purposes.

Dr. Fischer has used, so far, only plain water or weak solution of carbolic acid or iodoform in the case of suppurating buboes, and has obtained uniformly satisfactory results.—New Rem., Sept. 1883, 270, from Zeitsch. f. Therap.

Wood-Wool—A New Surgical Dressing.—Professor Bruns has introduced “wood-wool” as a cheap and useful dressing for wounds. It is finely ground wood, such as is extensively used in the manufacture of paper, is a clean-looking, delicate-fibred, soft, yellowish-white substance, having the odor of fresh wood, and absorbs an immense quantity of liquid. The best wood-wool was found to be that which was obtained from *Pinus picea*. The wood-wool was first pressed, passed through a sieve, then dried and impregnated with a solution containing one-half per cent. of sublimate (? Rep.) and ten per cent. of glycerin —New Rem., Dec. 1883, 361; Jour. Chem. and Drugg.

Collodion Cotton—Preparation.—Mr. F. A. Katschursky recommends the following process: Three parts of chemically pure sulphuric acid, specific gravity 1.84, are mixed with one part of distilled water and poured (slowly) into three parts of fuming nitric acid, specific gravity 1.48. When the mixture is cold he introduces one part of the purest cotton, from which all traces of grease have been removed. The method of introducing the cotton is peculiar, in that it is twisted loosely around the end of a glass rod, and left in the acids *three days*. The effect of the acid is at first to harden the cotton; when it begins to lose this quality, it is taken out of the acid, carefully dried, and washed in water acidified with fuming nitric acid, afterward with distilled water. It is advisable not to put more than 35 grammes ($1\frac{1}{4}$ oz.) of cotton in one vessel, as the heat is so great with larger quantities that it may take fire.

According to *Rundschau*, still better results are obtained by the following: Two parts of purified cotton are wound about a glass rod and dipped into a mixture of twenty-seven parts of sulphuric acid, specific gravity 1.49, with 13 parts of purified nitric acid, specific gravity 1.40. It is left there $1\frac{1}{2}$ hours, then taken out and dried, washed in acidified water, and afterward in distilled water—Phar. Rec., May 15, 1884, 219, from Polytechnisches Notizblatt.

Cane Sugar—Determination of Glucose in Commercial Samples.—Mr. R. H. Smiley has determined the amount of glucose in commercial samples of cane sugar, etc., using the Fehling's solution volumetric test, with the following results :

PARTS OF ANHYDROUS GLUCOSE IN 100 PARTS OF SAMPLES.

No. 1, powdered white sugar	0.19
No. 2, granulated sugar	0.47
No. 3, brown sugar	4.59
No. 4, white coffee-sugar	5.58
No. 5, white sugar cake	15.06
No. 6, maple syrup	25.24
No. 7, rock-candy	0.64
No. 8, light-brown sugar	0.77

—Pharm. Rec., April 1, 1884, 145, from St. Louis Drugg.

Sorghum Sugar—Quality, etc.—Mr. Oscar Houck reviews the history of sorghum sugar, particularly with reference to the industry as at present conducted in the United States. He also describes the process of sugar-making as carried out in the sorghum mill at Hutchinson, Kansas, and gives the results of analyses of an average sample of sorghum from this mill as follows :

Saccharose	92.00 per cent.
Glucose	4.50 per cent.
Moisture	1.50 per cent.
Ash	1.10 per cent.
Impurities	0.90 per cent.
	<hr/> 100.00

The amount of saccharose was ascertained by the use of the Wilde polariscope, which as an average showed 92°. With the same instrument he examined samples of different sugars with the following results (the strength of the solutions was 10 grammes of sugar and water sufficient to make 100 cc.):

White rock candy polarized	100°
Yellow rock candy polarized	93°
Best granulated sugar polarized	99°
White A sugar polarized	94°
Common raw sugar polarized	84°
Sorghum sugar (4 experiments)	90°, 92°, 93°, 92°

Common raw sugar was also subjected to analysis for comparison :

Saccharose	84.00 per cent.
Glucose	11.80 per cent.
Moisture	2.50 per cent.
Ash	0.70 per cent.
Impurities	1.00 per cent.
	<hr/> 100.00

The moisture and ash of granulated sugar was also ascertained, and found to be respectively 0.55 and 0.44 per cent. This shows in reference to the moisture, that the more glucose contained in the sugar, the more moisture is absorbed. As to the sorghum sugar the comparison is very satisfactory, as it contains eight per cent. more saccharose than the common raw sugar, and only two per cent. less than the A sugar, which has gone through a refining process. This very satisfactory result is due to the improved machinery of which the vacuum pan and the centrifugals are the most important, and without which the idea of sugar making, from sorghum, at the present sugar prices might be given up as almost hopeless. But as it is, sorghum sugar can compete with other sugars, both in price and quality.—Amer. Jour. Phar., May 1884, 256–260.

Sorgho and Imphy Sugar—Manufacture in the United States.—True *sorgho*, from Chinese seed, was imported into the United States in 1855 ; *imphy*, the variety from African seed, in 1857. Mr. F. Böckmann communicates a paper in reference to the cultivation of the plants and the manufacture of sugar. The quantity of cane sugar contained in sorghum is at its maximum when the seed begins to ripen, the proportions of the two sugars, at the different stages of growth, being shown in the following :

	Cane sugar.	Glucose.
1. When the ear was half out of the sheath. .	0.23– 4.91	3.32–6.37
2. Just before the fall of the stamens.	2.89– 6.54	3.26–5.26
3. When the ears commenced to turn color . .	7.84–11.78	2.16–6.04
4. Completely ripe	9.24–13.57	1.19–4.05

An analysis of sorgho juice gave : water, 80 per cent. ; cane sugar, 15–17 per cent. ; glucose, 1 per cent. ; starch, gum, pectic acid, albumin, red coloring matter, ash, etc., undetermined. The most primitive method of defecating the juice consists in heating it to 70–80° and adding lime ; at this temperature, the starch swells and diffuses throughout the liquid, and subsequently prevents the evaporation being carried to the point necessary for the crystallization of the cane sugar. A better method is to carefully filter the juice through a series of filters, to remove impurities, which promote fermentation, hinder evaporation, and impart a color to the product. After filtration, the juice is mixed with lime, and allowed to stand at the ordinary temperature for a certain time ; the clear liquid is then evaporated.—Amer. Jour. Phar., July 1883, 375–376, from Jour. Chem. Soc., 1883, 633.

Maple Sugar—Imitation.—It is said that the flavor of maple syrup may be communicated to cane or glucose syrup by tincture of guaiacum deprived of its resin by precipitation in water. A great deal of the maple sugar and syrup now sold is said to be nearly pure glucose prepared in

this way.—Amer. Jour. Pharm., June 1884, 310, from Popular Science News.

Sugar—Occurrence in Tobacco, which see under “Materia Medica,” p. 135.

Glucose—Correction of Popular Error Regarding its Characters.—Prof. Peter T. Austen, in reply to questions submitted by those interested in the manufacture of glucose, makes the following corrections regarding the very erroneous opinions held by many persons in reference to its history, process of manufacture, and healthfulness, which may properly find place here, since similar questions are frequently propounded to pharmacists.

“The terms ‘glucose’ and ‘grape sugar’ are but different names for the same thing, the former designating its solution in water and the latter its solid condition. Both are produced from starch, which, by a simple chemical process is converted into sugar.

“The change is but a slight one, as the chemical elements of starch and of sugar are identical in kind, varying only, and that to a very small degree, in their proportions. The formula of starch is $C_6H_{10}O_5$, while that of glucose (or grape sugar) is $C_6H_{12}O_6$. It has been found that starch can be converted into grape sugar by a simple process.

“It is called ‘grape sugar,’ because it is precisely the same as the sugar of the grape, as well as of all other sweet and wholesome fruits, and is the chief natural component of honey. Honey often runs as high as seventy per cent. of pure glucose, and the juice of the sugar-cane, sorghum, beet, and watermelon contains a considerable percentage of it.

“The starch intended for conversion may be derived from any source that is convenient or economical, whether it be from fruits, grains, roots, or plants. In this country, corn is the most available, being not only abundant, but exceedingly rich in starch of a most pure and excellent quality. The starch being given, which is itself a most useful and universal product of nature, being a constituent of all vegetable growth, and forming a large proportion of the food that we eat, the next step is to convert it into sugar to which it is already so nearly allied.

“This is done by simply submitting the starch, in liquid form, to the action of a minute percentage of dilute sulphuric acid, which quickly produces the required change.

“As soon as this is accomplished, the acid is completely neutralized and eliminated by the addition of a little chalk, which combines with it, forming the insoluble and harmless sulphate of lime or gypsum, which in its turn is entirely removed, after settling, by drawing off the clear, supernatant saccharine liquid. This is then filtered and refined precisely as in the case of cane sugar, so that the most searching chemical test can discover no trace of the acid or any harmful impurities.

“We then have, when properly evaporated, a pure, sweet, and color-

less liquid called 'glucose,' or, by further evaporation, the concentrated, white, and solid substance called 'grape sugar.'—New Rem., July 1883, 210, from "Sanitary Engineer."

Glucose—Delicacy of the Picric Acid Test.—Johnson states that if equal volumes of a solution of potassa and of a concentrated solution of picric acid are mixed, picrate of potassium is precipitated, which, on warming, dissolves to a transparent, orange-red liquid. If glucose be added to this, the liquid becomes purple, and almost black. Cane sugar does not yield this reaction unless it is inverted, in which case the change of color takes place at once. The reaction takes place only in alkaline solution, and is sharp enough to recognize 1.5 gm. glucose in 10 litres of water.—New Rem., Sept. 1883, 275, from Lancet and Chem. Zeit.

Glucose.—Preparation of a permanent "*Fehling's Solution*," for which see *Liquores*, under "Pharmacy," p. 80.

Sugar of Milk—Laxative Effect.—Traube states that two or three drachms of sugar of milk, taken in a tumbler half full of warm milk, before breakfast, will prove effectual as a laxative: Better than this, for use with children, is bread and molasses. Neither will be likely to do much good in overcoming decided constipation or costiveness; but the latter will often answer, when a mild laxative only is required, quite as well as drugs.—New Rem., Sept. 1883, 288.

Milk Sugar—Use for Sweetening Cow's Milk for Infants.—Dr. V. Poulain believes that the reason that cow's milk so often disagrees with children is to be found in the fact that cane sugar is used to sweeten it. In the "British Med. Jour., June 30, 1883, he says that for thirty-three years he has used the sugar of milk with the best results.—New Eng. Med. Monthly, January 1884, p. 190.

ORGANIC ACIDS.

*Oxalic Acid—Decomposition in Solution.**—On two occasions G. Fleury observed that titrated solutions of oxalic acid completely lost their acid reaction in the course of a few years, a considerable quantity of cryptogamic vegetation making their appearance at the same time. On the other hand, a solution containing 6.3 gm. of oxalic acid per litre did not show any alteration in four years.—Amer. Jour. Phar., Nov. 1883, 562, from Jour. Phar. Chim., May 1883, p. 387.

Verdigris—Adulteration.—Astre has observed adulterated verdigris. After dissolving the copper salt with water and acetic acid there remained an insoluble residue amounting to 10.36 per cent. and consisting of a silicious earth colored with Prussian blue.—Amer. Jour. Phar., Nov. 1883, 562, from Jour. Phar. Chim., May 1883, p. 386.

Professor N. Gille, also, has repeatedly met with a

* See also "Proceedings," 1874, 249.

Substitution for Verdigris in the Belgian market which was a blue-green crystalline powder, almost completely soluble in water, and when exsiccated by heat lost about 10 per cent. of water. On analysis, it yielded cupric oxide 44, anhydrous acetic acid 41, water 10, and impurities 5 per cent. The article seems to be the product of a special process, differing from that by which ordinary verdigris is prepared, when sheets of copper are left in contact with grape husks. A product very similar to the one alluded to above, is obtained by leaving copper in contact with cloth saturated with vinegar; this being chiefly normal copper acetate, it should be remembered that its action is far more energetic than that of verdigris.—Amer. Jour. Phar., Nov. 1883, 562, from Ann. Belges de Médic. Vétér.

Formic Acid.—Presence in *Cantharides*, which see under “Materia Medica,” p. 202.

Succinic Acid.—Probable formation during the preparation of *Extractum ferri pomatum*, which see under “Pharmacy,” p. 69.

Succinate of Iron.—*Medicinal Uses*—Dr. Jas. A. Stewart, of Baltimore, revives the claim that the hydrated succinate of the peroxide of iron is efficient in the treatment of gall-stones. He reports one case in which a patient, a lady of forty, who had suffered for three months, and was greatly emaciated, recovered health rapidly under drachm doses of the succinate. There had been no trouble for two years.—Louisv. Med. News.

Lactic Acid.—*Preparation*.—Mr. H. Kiliani recommends the following process: 500 grams of cane sugar are heated to 50° for three hours with 250 cc. of water and 10 cc. of sulphuric acid, in a flask of 2 litres' capacity. To the nearly colorless and cold solution of invert sugar, 400 cc. of a caustic soda solution (containing 1 part NaOH in 1 part OH₂) are added in quantities of 50 cc. at a time, judiciously cooling the flask during the addition, to prevent a high colored product, and agitating after each addition until a homogeneous mixture results. The mixture is then heated to 60° or 70° until a sample, heated to boiling with Fehling's solution, causes only a green tint. The solution, when cool, is exactly neutralized by a mixture of 3 parts of sulphuric acid and 4 parts of water, and when it has again attained the ordinary temperature, a crystal of Glauber's salt is dropped in, and complete separation of the sulphate of sodium effected by alternate immersion in cold water, and violent agitation, to remove the crystalline crust. It is then allowed to stand 24 hours, and the new solid cake of crystals, which is saturated with a reddish fluid, is extracted by 90 per cent. alcohol, the extraction being completed by washing on a suction filter. One half of the filtrate is saturated with carbonate of zinc, on the water-bath, filtered while boiling hot, and mixed with the other half. Crystallization commences on cooling, and

is finished in 36 hours, the yield of lactate of zinc being 30 to 40 per cent. of the sugar employed. The concentrated mother-liquor yields a further quantity of zinc salt. Should a small portion of the mother liquor from the second crystallization, on shaking with ether, yield to the latter free lactic acid, half of the solution is again boiled with excess of carbonate of zinc, in order to obtain more crystals on the addition of the other half of the filtrate.—Phar. Jour. and Trans., Aug. 18, 1883, 130, from Ber. d. D. Chem. Ges., 1882, 699, and Dingl. Polyt. Jour., 246, 443. See Amer. Jour. Phar., 1882, p. 216.

Lactic Acid—Method of Separation and Determination.—Mr. R. Palm observes that up to the present time, not a single insoluble lactate has been known, a circumstance which makes the determination of the acid one of great difficulty. He believes, however, that the following method of rapidly separating lactic acid and determining it quantitatively will be found reliable:

If a solution of basic acetate (subacetate) of lead be mixed with an excess of spirit of ammonia (alcoholic solution of ammoniacal gas), say in the proportion of one to five or six, whereby a clear or, at most, only opalescent solution results (unless too much spirit of ammonia be added), and lactic acid be now added (the more concentrated the better), an amorphous white precipitate is at once produced. All of the lactic acid is precipitated as a lead salt. The same precipitate is produced, if solution of subacetate of lead is added to a mixture of lactic acid and spirit of ammonia. But the reaction is performed to best advantage if spirit of ammonia be added to a mixture of basic acetate of lead and lactic acid as long as a precipitate is produced. The smallest quantities of lactic acid may thus be precipitated and detected with certainty. The precipitate forms immediately, is white, amorphous, and heavy (like chloride of lead), and settles at once to the bottom. It is soluble in much water, in acetic and lactic acids, and caustic potash, but insoluble in alcohol. It is, therefore, advisable to wash the precipitate with alcohol. On being dried upon the filter, it cakes together, and forms translucent pieces resembling dextrin.

The precipitate was found to contain, in the mean, 78.5 per cent. of oxide of lead, from which it appears that the salt has the composition $3\text{PbO}, 2\text{C}_3\text{H}_5\text{O}_3$, for, according to this formula, the salt contains 78.8 per cent. of lead oxide.—New Rem., Oct. 1883, 304, from Zeitsch. f. Anal. Chem., 1883, 223.

Lactic Acid—Estimation.—The following is given in “Zeitsch. f. Anal. Chem.” (22, 223), which will prove useful in determining lactic acid:

A mixture of 1 part of solution of subacetate of lead with 4 to 5 parts of spirit of ammonia, with the precaution that the mixture acquires at most an opalescence produces with lactic acid an amorphous, white pre-

precipitate of lactate of lead, which can be washed with alcohol, and on drying, yields transparent, dextrin-like pieces, having the composition $3\text{PbO}, 2\text{C}_6\text{H}_6\text{O}_6$, which contains 78.7 per cent. of oxide of lead.—New Rem., Aug. 1883, 228.

Calcium Lactophosphate—Preparation, etc.—Mr. R. Rother, in common with other writers, has hitherto held the view that calcium lactophosphate was simply an admixture, and not a definite chemical compound. Recent experiments, however, have led him to the conclusion that under certain conditions, lactophosphates in a true chemical sense are formed. The author explains his views at some length, and advocates the preparation of solutions of calcium lactophosphate, instead of as heretofore by dividing calcium phosphate in lactic acid by dividing calcium lactate in phosphoric acid. The method and proportions are given in a process for preparing the syrup of lactophosphate of calcium, which see under “Pharmacy,” p. 97.—Amer. Jour. Phar., Dec. 1883, 607–610.

Benzoic Acid—Preparation from Urine.—Mr. T. S. Dymond, after reviewing the process of preparation of benzoic acid from urine, finds that when the impure acid obtainable by the usual methods, and having a peculiar urine-like odor, is carefully sublimed, it can be obtained in a state of perfect purity and in beautiful crystals, which recrystallizes from water in a form different from that in which the acid crystallizes before sublimation, but identical with that in which benzoic acid obtained from gum crystallizes.

He finds, furthermore, that the U. S., Br. and Germ. Pharmacopœias agree in requiring the acid to be prepared from gum, and that both the Br. and Germ. Pharmacopœias go so far as to require the product to be impure (empyreumatic oil in the one and styrol in the other) in order to establish its source. The U. S. Phar. implies that benzoic acid must be made from benzoin with lime, and that it should be nearly chemically pure. The author's experiments and observations, however, lead to the conclusion that benzoic acid made from benzoin may not conform to the tests of the Br. and Germ. Pharmacopœias, whilst on the other hand the absence of urine-like odor in a sample of benzoic acid, and its conformity to the United States Pharmacopœia tests, cannot be taken as indicating that it has not been prepared from urine.

The following table shows how five specimens of benzoic acid compare with each other:

	Urine benzoic acid unsublimed . . .	Urine benzoic acid sublimed	Benzoic acid extract- ed with lime from Palembang gum .	A commercial speci- men of benzoic acid	Benzoic acid sub- limed from Penang gum
Solution in cold H_2SO_4 when warmed is . .	Dark brown.	Light brown.	Light brown.	Light brown.	Dark brown.
Mixed with moist CuO gives in the flame . .	No green tinge.	No green tinge.	No green tinge.	No green tinge.	No green tinge.
Warmed with solution of $K_2Mn_2O_8$ gives .	No odor.	No odor.	No odor.	No odor.	Smell of oil of bat- ter almonds.
A cold solution with $K_2Mn_2O_8$ becomes .	Colorless in 5 minutes.	Not colorless in 12 hours	Not colorless in 12 hours.	Not colorless in 12 hours.	Colorless* in 5 minutes.
Crystallizes from an aqueous solution in .	Prismatic nee- dles.	Flaky crystals.	Flaky crystals.	Flaky crystals.	Small needles.
Odor	Like urine.	Faintly aro- matic.	Faintly aro- matic.	Disagreeably aromatic.	Strongly aroma- tic.

—Amer. Jour. Phar., Feb. 1884, 94-98, from Phar. Jour. Trans., Dec. 15, 1883.

Benzoate of Ammonium—Solubility.—Neutral benzoate of ammonium is said to be soluble in 5 times its weight of water, and 28 times its weight of alcohol, at $15^\circ C.$ ($59^\circ F.$) Boiling water dissolves almost 80%, and boiling alcohol 13% of its weight of the *neutral* salt. The *acid* salt is reported to be much less soluble. When, by keeping, its ammonia has escaped, and the salt has become acid, carefully saturate with ammonia. —Amer. Drug., April 1884, 75.

Salicylic Acid—Objections to Its Use as a Food Preservative.—Prof. Brouardel observes that, although the beneficial operation of salicylic acid in certain diseases is fully admitted, the theory of its action is very imperfectly understood. It is known, however, that when introduced into the economy it is eliminated by the kidneys and liver; and its warmest partisans admit that its use is contra-indicated in the subjects of those diseases, which prevent its due elimination, and thus give rise to an accumulation that in several instances has proved fatal. Moreover, elimination is sometimes impeded from unknown causes in persons in whom the functions of those organs work healthily; while in aged persons it is always very slow. Under any circumstances, only a portion of the salicylic acid is eliminated, the remainder undergoing combinations in the tissues, which, although they may prove therapeutically useful, and even for a time produce no evil consequences, could not be indefinitely prolonged without mischief ensuing.—Amer. Jour. Phar., May 1884, 268-269; Med. Times and Gazette, Feb. 16, 1884.

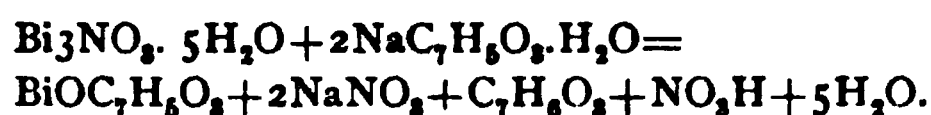
Salicylic Acid—Injurious Effects.—The term “salicylage” is applied to the practice resorted to in Paris of using salicylic acid as a preservative of food and drinks. The question of its injurious effects was recently referred by the government to Prof. Brouardel, who reports as follows: 1. The daily use of even the smallest dose of salicylic acid is unsafe, its innocuity not having been as yet demonstrated. 2. It is certainly dangerous for the subjects of lesions of the kidneys or of the liver from old age, or by some degenerative process. 3. The prohibition of salicylage should be strictly maintained.—Amer. Jour. Phar., Feb. 1884, 121, from Med. and Surg. Rep., Jan. 19, 1884.

Salicylic Acid—Value as an Abortive in Avoiding Variola.—The editor of the “Southern Clinic” certifies, along with Dr. Claridge and Dr. De-Cailhol, to the abortive power of salicylic acid in variola, given in the ordinary doses. Dr. Bryce thus concludes: “I believe salicylic acid, used early and freely, will place small-pox in the category with measles, chicken-pox, and other trifling complaints.”—Louisville Med. News, July 21, 1883; Amer. Jour. Phar., Nov. 1883, 577.

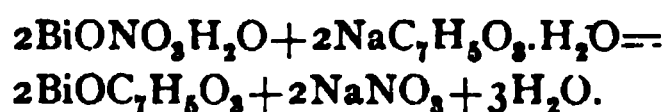
Salicylate of Bismuth—Therapeutic Value and Preparation.—This compound is found, after long experimentation by Dr. Desplat, to be highly valuable in the treatment of typhoid fever, being given in doses of about a scruple, and in daily quantities of about one drachm and a half.

Mr. Frank H. Rosengarten states that the salt cannot be prepared by double decomposition, and that it can be formed only as a sub-salicylate, which he describes as follows: This salt is a white, soft powder, insoluble in water, without separating the salicylic acid on heating to boiling; but is readily soluble in dilute muriatic acid when boiled, the salicylic acid separating, on cooling, in flocculent white crystals. Care must be taken in its preparation to avoid too much heat, as the tendency is to convert the salt into ordinary oxide of bismuth and salicylic acid.—Amer. Jour. Phar., Sept. 1883, 435-436.

Salicylate of Bismuth—Preparation.—Dr. L. Wolff has experimented with a view to the preparation of this compound by double decomposition. He found that a glycerin solution of crystallized bismuthous nitrate bore dilution with one to two parts of water before precipitating the bismuthyl nitrate; and, acting on this, made a concentrated solution of sodium salicylate, with which he decomposed the glycerin solution of crystallized bismuthous nitrate, obtaining thus a bismuthyl salicylate, sodium nitrate, free nitric acid, salicylic acid and water, which were removed with water, and the still adhering salicylic acid removed by washing with hot water and subsequently alcohol. The reaction occurring under these circumstances with the sodium salicylate, as given in the U. S. Pharmacopœia as $2\text{NaC}_7\text{H}_5\text{O}_2 \cdot \text{H}_2\text{O}$, would be expressed:



As the bismuthyl salicylate treated with a concentrated solution of sodium bicarbonate yielded bismuthyl carbonate and sodium salicylate, he inferred that bismuthyl nitrate would yield, also, on boiling with a concentrated solution of sodium salicylate, a bismuthyl salicylate, which he found to be the case, the reaction being as follows:



The precipitate, being well washed with hot water, presented the same appearance as by either of the previous methods, and when dried and combusted on the platinum foil grew dark brown, and burnt off to the greater part with evolving phenol vapors.

The salicylate of bismuth presents a slightly pinkish appearance and is of a granular consistence, which is not readily overcome to an impalpable powder in the mortar. Under the microscope it is easily distinguishable from the subnitrate by being of a distinct granular character, the granules of even size, resembling the conidia of fungoids, while the former consists of uneven broken crystals.

In water, glycerin, alcohol, and ether it seems insoluble, while its solution in acids is probably due to its decomposition, and formation of bismuthous salts. Tests for its purity are the absence of acid reaction of water boiled with it (salicylic acid), its rapid combustion on platinum foil, with liberation of phenic odors, free from nitrous acid vapors, and lastly, its distinct granular appearance without crystalline fragments under the microscope (bismuthyl nitrate).—Amer. Jour. Phar., Nov. 1883, 554–556.

Citric Acid—Purification from Contamination with Iron.—A quantity of citric acid (40,000 lbs.), having been carelessly packed in tinned iron cans, became spoiled in taking up about one per cent. of iron and zinc. Mr. Wm. W. Meyke devised the following successful process for its purification:

To a cold filtered solution of 16 parts of the impure citric acid in 96 parts of distilled water, there were added, under constant stirring, and with avoidance of much heat, 21 parts of chloride of lime, or so much of it as the liquid could dissolve. The liquid was then rapidly strained to remove suspended impurities, and heated to boiling, whereby the calcium citrate was completely separated, while the chlorides of iron, zinc, and manganese remained in solution, and could be easily separated from the precipitate by washing. The precipitated citrate of calcium was immediately transferred to a strainer, and washed with boiling water until the washings were no longer precipitated or rendered brown by sulphide of ammonium. When carefully operating, the yield of citrate of calcium

amounted to about 20 parts. This was mixed, while still moist, and under application of heat up to boiling, with enough diluted (1:5) sulphuric acid, until a filtered portion mixed with an equal volume of strong alcohol and again filtered, showed a slight excess of sulphuric acid, when tested with nitrate of barium. After the citrate of calcium was completely decomposed, the solution of the pure citric acid was separated from the sulphate of calcium by filtration, evaporated to nearly a syrupy consistence, and set aside so that gypsum could deposit. The liquid was then decanted, the precipitate washed, the united liquids further evaporated on the water-bath, and then set aside to crystallize, which was much accelerated by placing in the liquid a small crystal of citric acid.

Sixteen parts of impure citric acid thus purified, yield 12 parts or 75 per cent. of perfectly pure and white crystallized acid,—New Rem., Oct. 1883, 307, from *Phar. Zeitschr. f. Russ.*, 1883, No. 19.

Citrate of Potassium—Acidity.—Mr. H. P. Reynolds draws attention to the decided acidity of a commercial sample of citrate of potassium, bearing the label of a reputable American manufacturing firm.—*Drugg. Circ.*, July 1883, 98.

Citrate of Iron and Quinine—Assay of Commercial Samples.—Mr. J. C. Falk has assayed six commercial samples of citrate of iron and quinine by the process of the Pharmacopœia with the following results :

- No. 1. 11.25 % alkaloid, of straw-yellow color.
- No. 2. 9.625 % alkaloid, of dark-brown color, resinous appearance and fracture.
- No. 3. 9.375 % alkaloid, similar to No. 2 in appearance.
- No. 4. 9.5 % alkaloid, similar to No. 2 in appearance.
- No. 5. 10.25 % alkaloid, not as dark as No. 2, but of resinous fracture.
- No. 6. 9.625 % alkaloid, resembling No. 5.

A sample of citrate of iron and quinine prepared by the author in strict conformity with the Pharmacopœia yielded 11.925 % of almost pure white alkaloid. The appearance of the alkaloids from the last five samples leads the author to the supposition that they were prepared with unbleached and amorphous alkaloids in place of the pure white quinine directed in the Pharmacopœia. They were proven not to contain any cinchonine. As regards the Pharmacopœial process of assay, the author notes that four separations of chloroform of 15 cc. m., each were not sufficient in some cases when five and even six such additions were necessary to thoroughly extract the alkaloids. It was also found necessary to increase the amount of tartaric acid to one gram, before precipitating with soda, for when iron is precipitated the clear separation of the chloroform is hindered very much.—*Amer. Jour. Phar.*, June 1884, 315-317.

Sodio-Bismuth Citro-pyroborate—A Permanent and Soluble Bismuth Compound.—Mr. R. Rother's experiments have led him to the formation of a new bismuth compound—the sodio-citropyroborate, which he de-

scribes as a colorless, amorphous, non-deliquescent salt, very soluble in water, insoluble in alcohol, and possessing a faint saline, slightly metallic, but not unpleasant taste. Although the author has made no experiments in this direction, he evidently considers that it may be a useful compound for the preparation of pepsin combinations. It is prepared as follows :

Bismuth citrate 399 parts.
Sodium pyroborate, in powder. 382 "
Water sufficient.

Mix the citrate and borax with 2,400 parts of water and apply heat until the citrate is all dissolved. Then filter the solution after having diluted it with its volume of water, and evaporate it at a uniform temperature to a dense syrupy consistence, and spread it on plates of glass or porcelain, so that on cooling the salt may be obtained in scales.

It appears that the new salt is a scaled amorphous compound which is permanent in the absence of water, and equally permanent in any large proportion of water, but is readily and completely decomposed by a comparatively small quantity of water. In its production in the solid form some care is necessary, during the later stage of evaporation, not to let the temperature sink, as this partial cooling in contact with the modicum of water causes a decomposition and consequent turpidity, which subsequent heating does not correct.—*Amer. Jour. Phar.*, June 1884, 317-320.

Citric and Tartaric Acids—Detection of Lime and Sulphuric Acid.—While preparing the articles, "Acidum Citricum" and "Acidum Tartaricum" for the second edition of the *Pharm. Germ.*, Robert Otto made some observations which he believes to be new, relating to the test for lime and sulphuric acid in the above-mentioned two acids, in absence as well as in presence of ammonium salts. He says :

In order to determine whether, and eventually how far, the presence of ammonium salts affected the tests for lime in citric or tartaric acids, equally strong solutions of the two latter were prepared, mixed with equal quantities of oxalate of ammonium, and with different quantities of solution of sulphate of calcium. The following facts were then observed :

1. *Citric Acid.* 1 gm. dissolved in 12 gms. of water, and mixed with 1 cc. of solution of oxalate of ammonium (1 in 20). Three portions :

After addition of

a. 1 cc. of sol. sulphate calcium ; remained clear for a short time.

b. 2 cc. of sol. sulphate calcium : the same.

c. 5 cc. of sol. sulphate calcium : distinctly cloudy within same time.

I. a. *Citric Acid.* 1 gm. dissolved in 10 gms. of water, the solution approximately neutralized with water of ammonia (sp. gr. 0.960), then

mixed with : cc. of solution of oxalate of ammonium (1 in 20). Three portions.

After addition of

- a. 5 cc. of sol. sulphate of calcium : perfectly clear yet, after 15 minutes.
- b. 10 cc. of do. : do.
- c. 20 cc. of do. : do.

II. *Tartaric Acid*. 1 gm. dissolved in 10 gms. of water, and mixed with 1 cc. of oxalate of ammonia (1 in 20). Four portions.

After addition of

- a. 1 cc. of sol. sulph. calcium : perfectly clear, after 15 minutes.
- b. 5 cc. of do. : do., after 5 minutes.
- c. 8 cc. of do. : perfectly clear, after 5 minutes.
- d. 10 cc. of do. : faintly cloudy, after 5 minutes.

III. a. *Tartaric Acid*. 1 gm. dissolved in 10 gms. of water, the solution approximately neutralized with water of ammonia (sp. gr. 0.960), then mixed with 1 cc. of solution of oxalate of ammonium (1 in 20). Three portions.

After addition of

- a. 4 cc. of sol. sulphate calcium : perfectly clear, after 5 minutes.
- 8 cc. of do. : distinctly turbid, after 5 minutes.
- 10 cc. of do. : cloudy-turbid, after 5 minutes.

These experiments show that the detection of calcium by oxalic acid is rendered difficult in presence of ammonium salts, while, on the other hand, these salts slightly facilitate the detection of calcium in tartaric acid.

Regarding the detection of *sulphuric acid* in citric and tartaric acids, by means of nitrate of barium, the experiments have shown that this is accomplished with greater precision in acid solution than in one approximately neutralized with ammonia.

I. *Citric Acid*.—One part dissolved in 10 parts of water. Twelve cc. of the solution mixed with 1 cc. of the solution of nitrate of barium (1 in 20).

Samples.	In acid solution.	Approximately neutralized with ammonia.
a.	Faintly opalescent.	Remains clear.
b.	Distinctly turbid.	do.
c.	Between a and b.	do.
During equal period of time.		

II. *Tartaric Acid*.—One part dissolved in 10 parts of water.

Five cc. of the acid solution, mixed with 1 cc. of $\frac{1}{10}$ normal sulphuric acid, on addition of 1 cc. of sol. of nitrate of barium, yielded *at once* a strong turbidity.

Five cc. of the solution, approximately neutralized with water of ammonia (0.960), even when mixed with 10 cc. of $\frac{1}{10}$ normal sulphuric acid, and 1 cc. of sol. of nitrate of barium, *showed no turbidity within six hours*.—Amer. Drug., May 188—, 89, from Arch. d. Pharm., 1883, Dec.

Tartaric Acid—Detection in Citric Acid.—According to H. Athenstädt, lime water may be used as a very delicate test for the detection of tartaric acid in citric acid; but it is necessary that the lime water be fully saturated, so that 100 cc. of it require *not less than* 4.8 cc. of standard volumetric hydrochloric acid.

0.5 gm. of the citric acid are dissolved in 10 gm. of water, and of this solution 5 drops are carefully added to 15 gm. of the lime water. Even if only traces of tartaric acid were present, a distinct turbidity will be noticed after a few seconds, which becomes more intense as the drops of the acid solution diffuse through the lime water and become mixed with it. Shaking of the test-tube must be carefully avoided.

If as small a quantity as one per cent. of tartaric acid is present, the above test will certainly detect it.

The author found seven different samples of citric acid, obtained from different drug houses, to show undoubted traces of the presence of tartaric acid.—Amer. Drug., May 1884, 94, from Arch. d. Pharm.

Mr. Th. Push has found Mr. Athenstädt's method also unreliable, since the addition of the solution of citric acid, *entirely* free from tartaric acid, if performed as directed, produces the same kind of opalescence as if one per cent., or thereabouts, of tartaric acid had been present. He proposes the following method: Pour 10 gm. of pure, colorless, concentrated sulphuric acid upon 1 gm. of powdered citric acid, in a test tube. Hang the latter into a beaker glass containing water, and heat the latter, for one hour, to boiling. The acid dissolves with a citron-yellow color, which, if the acid was pure, does not change inside of an hour; but if it contained only as much as one-half of one per cent. of tartaric acid, the liquid becomes gradually brownish after twenty-five to thirty minutes, and reddish-brown after one hour. Of course, the crystals selected must be absolutely free from foreign organic substances. — Amer. Drug., June 1884, 106, from Arch. d. Pharm.

Tartaric Acid—Examination for Lead.—Mr. W. H. Symons has examined three commercial samples of tartaric acid purchased at different times during the year, and found them all to give indications of lead by sulphuretted hydrogen. An attempt was made to estimate the amount of metal by colorimetric tests, comparing solutions of known quantities of the acids with a standard solution of lead and pure acid, by means of sulphuretted hydrogen. 0.003, 0.004, and 0.010 per cent. were the results arrived at; but the presence of other metals somewhat interferes with the accuracy of the method.—Phar. Jour. and Trans., January 19, 1884, 561.

Tartaric Acid—Determination in Crude Tartar.—The following method is given in "Zeitschr. f. Anal. Chem.:"

Exactly 3 grams of the finely ground sample are mixed in a small beaker with 30 to 40 cc. water and 2 to 2.5 grams potassium carbonate, and boiled for ten to twenty minutes, constantly stirring. The acid potassium tartrate and the tartaric acid combined with calcium are thus converted into neutral potassium tartrate. The whole is introduced into a measuring cylinder or flask holding 100 cc., cooled, made up to 100 cc., shaken up, and after standing for some time, filtered through a dry filter into a dry flask; 50 cc. of the filtrate are then evaporated down to about 10 cc., mixed with 2 cc. glacial acetic acid, and from 100 to 120 cc. of alcohol at not less than 95 per cent. To effect the complete separation of the bitartrate, the whole is well stirred for some time and after standing is filtered. The residue is washed with alcohol at 95 per cent. until the washings which run off after dilution with water no longer show an acid reaction.

The moist precipitate, together with the filter, is returned to the capsule, stirred up with water, heated to a boil, and titrated with normal soda. The number of cc. consumed multiplied by ten gives the percentage of hydrated tartaric acid in the sample.—New Rem., August 1883, 242.

Tartaric Acid—Variability and Commercial Quality.—Dr. E. R. Squibb draws attention to the variability in commercial powdered tartaric acid, some being more hygroscopic than others. He ascribes this to the fact that manufacturers push the crystallization and consequent evaporation too far, whereby a portion of the acid becomes decomposed and changes into a mucus-like substance, which finally becomes so large in quantity as to prevent crystallization. The different crops of crystals may be equally well marked, and yet some of this uncrystallizable matter will remain in the interstices of the crystals; and just in proportion as it remains will the powder be clammy and dead, and be liable to cake. The first crop of crystals always yields a nice, lively powder, which does not attract the moisture of damp weather, and scarcely cakes at all. The remedy consists in not carrying the crystallization too far, and, after obtaining several crops of crystals, to precipitate the remaining tartaric acid in the mother liquid, as tartrate of lime, which should be carefully washed to free it from any adhering mucous matter.—Drugg. Cir., June 1884, 86, from "Ephemeris."

Tartar Emetic—Valuation.—Mr. W. B. Hart observes that tartar emetic, whose value to the dyer depends solely on the amount of anti-mony it contains, has of late been lowered in quality, until in some cases it contains only about one-half the amount of metal that a good commercial sample should contain. The usual method of estimating the anti-mony in this salt—by means of a standard solution of iodine—gives good

results in careful and patient hands, but can well be replaced by the following process, which is rapid, and for all practical purposes accurate, the end being sharp, and denoted at once, which with the iodine process is both tardy and tiresome. The process is conducted as follows: A weighed portion of the tartar emetic is dissolved by the aid of heat, cooled, and made alkaline with carbonate of sodium. A known amount of hypochlorite of calcium solution is added in excess, this being shown by the blue color which a drop of the liquid gives to potassic iodide and starch paper. The excess of hypochlorite of calcium is now found by titrating with a standard solution of arsenite of sodium, until the liquid ceases to give a blue color to the potassium-iodide starch paper. The value of the hypochlorite added is found by taking an amount equal to that of the tartar emetic, or an aliquot portion, making alkaline, and titrating with arsenite of sodium. This value should be found at least once a day when required. If an aliquot part is taken, the value of the whole is then to be calculated. The worth of the total hypochlorite added being known, and that of the excess also known, the amount of hypochlorite, and therefore chlorine, used to oxidize the antimony is thus obtained by difference, and the amount of antimony determined.—Phar. Jour. and Trans., June 28, 1884, 1053–1054, from Jour. of the Soc. of Chem. Industry, May 29, 1884.

Sclerotic Acid—Improved Method of Preparation.—The occasionally unsatisfactory action of sclerotic acid is due to the fact that manufacturers supply this preparation in an impure condition.

To remove these defects, and to place in the hands of practitioners as uniform a preparation as possible, Dr. Podwissotzky has improved its method of preparation as follows:

Four hundred grams of powdered ergot are heated for 3 or 4 hours on a steam-bath with 1 litre of distilled water and 60 gm. of diluted (1 : 7) sulphuric acid, then pressed, and the residue again extracted with 500 cc. of distilled water for two hours in the same manner. The liquid is expressed, united with the first, the whole heated to 70° C. (158° F.), and treated with neutral acetate of lead until this ceases to yield a precipitate. This reagent throws down the erythrosclerotin as an insoluble violet lead compound. (Erythrosclerotin yields precipitates with metals, earths, and alkaline earths; if freed from these substances it is soluble in alcohol, with red color. After an extract of ergot has been freed from erythrosclerotin, it no longer gives a precipitate with acetate of lead.)

After the liquid, together with the precipitate, has been warmed for one hour more on the water-bath, it is filtered, and the excess of lead removed from the filtrate by hydrosulphuric acid. The sulphide of lead having been separated by filtration, the straw-yellow liquid is evaporated on a water-bath (if at all possible, in a vacuum apparatus) to a syrupy consistence (to about 150 cc.), or, better still, until a coffee-brown color

shows itself at the margin of the residue in the dish. (This is a sign of the *beginning* decomposition of the sclerotic acid; the dark color, when once produced, cannot be removed.)

The residue is now briskly stirred up and mixed with $1\frac{1}{2}$ litres of absolute alcohol, whereupon the sclerotic acid will separate in 10 or 12 hours. The alcohol is then poured off, another half litre of absolute alcohol poured on, with which the mass is thoroughly kneaded in a mortar. Finally, it is removed and dried over caustic lime and sulphuric acid. By repeated kneading and working with absolute alcohol, the product may be rendered dry enough to be reduced to powder.

The yield is 12 to 14 gm., and the sclerotic acid thus obtained is best preserved over lime and sulphuric acid. Or the product may be preserved in absolute alcohol, and may also be transported or shipped in the latter.

The product is quite light-colored, not deeper than gum arabic, but it cannot be obtained entirely free from calcium and potassium salts.

While Bonjean's as well as Wernig's ergotin, when used hypodermically, produce (often?) irritation or inflammation of the connective tissue, the latter does not occur with sclerotic acid. However, a solution of the last-named does not keep long, and, to obviate this, some have been in the habit of combining it with salicylic acid. This being, however, but little soluble, and sometimes separating in form of fine needles, which themselves may cause irritation, Dr. Podwissotzky recommends to use thymol water (1:1000) for solution. In this form, this remedy has been used successfully in the Insane Asylum at Dorpat, and is also commonly dispensed by the pharmacists of the city.

When treated with alkalies or alkaline earths, sclerotic acid *loses its effects completely*, a gum-like body being then formed, while ammonia is given off.—New Rem., Sept. 1883, 271-272, from Phar. Zeitschr. f. Rend., 1883, 393.

Pipitzahoic Acid.—A peculiar acid from "Raiz del Pipitzahuac," the root of a species of *Perezia*, which see under "Materia Medica," p. 149.

Thapsic Acid.—A new acid from *Thapsia Garganica*, which see under "Materia Medica," p. 169.

Koussinate of Sodium—Preparation.—According to a writer in "Bol. Farm." (1883, 319), one of the most effective combinations of koussin is that with soda, which is obtained in the following manner:

Any desired quantity of koussin is dissolved in boiling water and bicarbonate of sodium is added until solution is effected. The solution is boiled a few minutes with a little animal charcoal, and then filtered. The resulting clear and but slightly colored solution is evaporated in a porcelain capsule to dryness, at a gentle heat.

Koussinate of soda is an amorphous powder, slightly hygroscopic, of an intensely bitter taste, and a whitish to slightly yellowish color. It is soluble in cold, and still more soluble in hot water; also easily soluble in alcohol, excepting a little excess of bicarbonate of sodium, which is present. Being so readily soluble, it can be given in all forms, and is said to be a most effective agent against *tænia* and round worms.—*Amer. Drugg.*, May, 1884, 96.

Tannin—Determination in Vegetable Cells.—Mr. W. Gardiner assigns reasons for objecting to the micro-chemical reagents hitherto used for the detection of tannin. Iron sulphate he finds convenient when the products are blue and not green. He prefers to use a solution of ammonium molybdate in concentrated ammonium chloride: this gives with tannin a copious yellow precipitate. It can also be used for determining the presence of

Digallic Acid, with which it produces a red color; the compound with gallic acid is soluble in ammonium chloride, while that with tannin is not.

The determination of tannin in tissues preserved in alcohol is facilitated by the fact that dead protoplasm gives a permanent precipitate with tannin. The author regards tannins as secondary products of metastasis, especially when this process is very active, and thinks that they are of no further use in the vegetable economy. In the old leaves of a cutting of the cherry laurel which had already put out roots and shoots, the quantity of tannin was considerably increased.—*Phar. Jour. and Trans.*, Jan. 26, 1884, 588, from "Proceedings" of the Cambridge Philosophical Society.

Oak Tannin—Characters, etc.—Mr. C. Etti has subjected the tannin of oak bark to a nearer examination. It exists in two forms, viz., as a tannic acid, which in the free state has a reddish-white color, and as an anhydride of that acid, called *phlobaphene*, the color of which is a brown-red. The distinction between these two bodies is familiar to tanners, who designate the anhydride simply as "coloring matter," and reject barks containing a large proportion of it, as it imparts too red a color to leather dyed with such barks.

The question as to the existence of a glucoside in oak bark is now decided in the negative, as tannic acid extracted from the bark by ethyl acetate does not yield any such substance. The reactions which were supposed to indicate the presence of a glucoside were really due to *lævulin*, which, on treating the bark with dilute sulphuric acid, was converted into *lævulose*.

The tannic acid obtained by agitating an alcoholic extract of the bark with ethyl acetate may be contaminated with two substances, a brownish-green amorphous terpene-resin and *phlobaphene*. The former may be separated by its ready solubility in ethyl acetate, ethyl oxide, and benzene.

The phlobaphene is easily recognized by the brown-red precipitate which it gives with lead acetate.

Quercitannic Acid cannot be extracted from the bark in the pure state by ethyl acetate, inasmuch as it decomposes that compound into alcohol and acetic acid almost as easily as sulphuric or hydrochloric acid, and the acetic acid thus set free dehydrates a portion of the tannic acid, producing phlobaphene. Pure quercitannic acid dissolves completely in ethyl acetate, and does not give up any foreign bodies to pure ethyl oxide or to benzene; its solution in very dilute alcohol gives with basic lead acetate a precipitate of pure yellow color.

Quercitannic acid is represented by the formula $C_{17}H_{16}O_9$. At $130-140^\circ$, it gives off water, and is converted into the brown-red anhydride, $C_{34}H_{32}O_{17} = 2C_{17}H_{16}O_9 - H_2O$, identical with the phlobaphene contained in the bark. 1 mol. of this substance boiled with sulphuric or hydrochloric acid gives up 1 mol. water, and is converted into a second anhydride, $C_{34}H_{32}O_{16}$; and by boiling the tannic acid free from anhydrides with either of these anhydrides, a third anhydride, $C_{34}H_{32}O_{15}$, is obtained. These three anhydrides are soluble in alcohol and in caustic alkalies.—*Amer. Jour. Phar.*, March 1884, 135-137, from *Jour. Chem. Soc.*, Nov. 1883; *Monatsh. Chem.*, iv. 512-530.

Phlobaphene is nearly insoluble in water and in ether, but dissolves readily in alcohol of all strengths. As prepared from the bark, it may be contaminated with terpene-resin and pectin-substances. The former of these bodies may be recognized and separated by treatment with ether or benzene, which dissolve it; the pectin-substances by their insolubility in spirit of 90 per cent. The presence of tannic acid in the phlobaphene may be recognized by the fact that the latter, after being freed from adhering moisture by drying at 110° , gives off a further quantity of water at $130-140^\circ$.

The phlobaphene submitted to dry distillation, yielded pure catechol, free carbon, and an oil insoluble in potash, smelling like the terpenes and containing 72.46 per cent. C and 7.11 H. This oil, oxidized with permanganate, yielded an amorphous resin, whence the author concludes that it is derived, not from the tannin, but from the terpenes mixed with the phlobaphene which was submitted to dry distillation.

Another oak-bark examined by the author yielded a tannic acid having the composition $C_{28}H_{26}O_{11}$, and agreeing with the former in all its properties, excepting in its reaction with ferric chloride, with which it gives a bluish green color, quickly changing to deep green, and on addition of sodium carbonate, first to blue and then to red, whereas the quercitannic acid above described, and all its anhydrides, give with ferric chloride a black-blue precipitate. This tannic acid begins to lose water at 124° , melts at 140° , resolidifies on further loss of water, and is converted into a brown-red substance identical in composition with phlobaphene.

Tannate of Sodium—Therapeutic Uses.—This compound has lately been recommended instead of tannin to lessen the excretion of albumen in albuminuria; but the statements concerning its value are somewhat conflicting. Ribbet found that it lessened the excretion of albumen in animals. Dr. Brien, on the other hand, found, in four carefully observed cases of patients suffering from chronic albuminuria, that it was of no use whatever; some patients can take it well; others vomit after every dose.—Practit., Oct., p. 204, and Pharm. Journal; Amer. Drug., March 1884, 47.

Tannate of Mercurous Oxide.—See *Mercury*, under “Inorganic Chemistry,” p. 243.

Leditannic Acid and

Callutannic Acid.—Preparation, etc., from *Ledum palustre* and *Calluna vulgaris*. See *Ericaceæ*, under “Materia Medica,” p. 147.

Caffetannic Acid—Presence in Tobacco.—Mr. T. I. Savery, in a paper before the Chemical Society of London, stated that while examining tobacco for sugar he found another substance that reduced Fehling's solution. This substance was almost completely removed by sub-acetate of lead. By treating a tobacco infusion with sub-acetate of lead, and afterwards with hydrogen sulphide, he succeeded in isolating the substance. From unmanufactured tobacco a purer product was obtained.

The following reactions were noted: On testing it with ferric chloride a green color, changing to red on addition of potash. Ferrous sulphate gave no color, but when to this ammonia was added a dark brown color was observed. Sulphuric acid gave a red color, which on addition of nitric acid became claret. Potash or ammonia produced a green color, and hydrochlorides of quinine or of cinchonin were precipitated by it. The conclusion of the investigator was that it was *caffetannic acid*. By boiling this acid with a small quantity of dilute hydrochloric acid it is converted into another substance, which he names tobacco-tannic acid.—Pharm. Rec., May 15, 1884, 219, from Chem. News.

Gallic Acid—Distinctive Test.—Mr. Sydney Young states that when an aqueous solution of gallic acid is treated with a solution of cyanide of potassium, a beautiful red coloration is produced, which, however, disappears after a short time if the liquid is not disturbed. The surface, however, remains colored, and in tapping the test-tube the superficial colored portion sinks, and if now the test-tube is shaken energetically, the color reappears as at first, and again disappears on standing. This alternate production and disappearance may be repeated as many as fifteen or twenty times, the solution finally attaining a permanent brownish-yellow tint.

Tannic acid, when pure, gives no coloration, but commercial tannic acid invariably gives the reaction, though the color is only feeble. The

test, therefore, serves to distinguish between the pure substances and for the detection of gallic in tannic acid.—*Drugg. Circ.*, Oct. 1885, 151, from *Chem. News*.

ORGANIC BASES.

Alkaloids—New Reagents.—Mr. R. Palm has shown previously (see *Proceedings*, 1883, 265) that the alkaloids are precipitated by solutions of alkaline sulphides or persulphides, and moreover that in contact with a solution of sodium thioantimonate, solutions of the alkaloid salts form characteristically colored precipitates consisting of the alkaloid hydro-sulphides mixed with antimony sulphide. When the solutions of the alkaloid and reagent are dilute, these precipitates appear as colorless turbidities, which become yellow on exposure to the air; whilst with concentrated solutions they are yellow to reddish brown, and in saturated solutions they form resinous masses. The precipitation is more complete in dilute solutions, and is accelerated by gently heating, or by the addition of strong alcohol. In most cases the yellow precipitates are dissolved by excess of the thioantimonate; they are, with few exceptions, amorphous, and dilute acids only partially separate the alkaloid from them. The chemical composition of the precipitates has not been determined. Sodium thioantimonate produces the following changes with the alkaloids referred to. With quinine sulphate in dilute neutral solutions, a white turbidity; in stronger solutions, yellow flocks, which on shaking form resinous lumps and become darker. When hot solutions of the quinine salt and reagent are mixed, resinous masses form at once, which when dry fall to a fine yellow powder like lead iodide. With cinchonine sulphate, in dilute solutions, dark yellow (leather color) flocks form at once; they do not coagulate either on standing or heating. With quinidine sulphate, the effect is almost exactly the same as with the quinine salt, with the exception that the whole of the precipitate does not become resinous, and when dry is of a darker yellow color (an intense dark chrome-yellow): the precipitation is also more complete. With morphine hydrochloride in dilute solutions, yellow flocks are at once deposited, which are darker in strong solutions, and when dry resemble powdered gamboge in color. With codeine hydrochloride, a flocculent precipitate is produced, which when dry resembles the quinidine precipitate in tone, being a paler yellow than the morphine precipitate. With narcotine, in concentrated hot solutions, the precipitate coagulates in resinous masses, which when dry have the color of dry precipitated ferric hydroxide. With strychnine nitrate, the reaction is more sensitive than with all the other vegetable alkaloids, the strychnine being entirely precipitated, and moreover the precipitate is not soluble in excess of the reagent. In dilute solutions of strychnine nitrate, colorless flocks separate which become yellowish in air; in concentrated solutions, yellow flocks form which do not coagulate on standing, and when dry are of a

fine, intense, deep golden-yellow color. With brucine nitrate, when the reagent is added in successive portions to a moderately concentrated solution of this alkaloid salt, three distinct precipitates are obtained: 1. Reddish yellow, which collects in resinous masses. 2. Light golden yellow flocks. 3. Colorless flocks, which form a crust on the surface of the liquid. When the mixed precipitates are boiled with water, the greater part dissolves, leaving an amorphous deep orange residue. The solution deposits yellow crystals of the double sulphide.

With atropine sulphate in strong solutions, a yellow deposit is formed, which coagulates on shaking or heating, but when dry is not so dark as the dry morphine precipitate.

With bebeerine hydrochloride, a dark-colored precipitate is formed which coagulates in strong, and especially in hot, solutions, and when dry is grayish-brown. The alkaloids also form double sulphides with other metallic sulphides.

Lead chloride can be used as a reagent for vegetable alkaloids; it should be dissolved in a solution of sodium chloride, which dissolves more of the lead salt than cold water does. The precipitates are generally crystalline, and consist of a mixture of lead chloride and an alkaloid salt. Quinine and brucine form crystalline powders; cinchonine, morphine, and codeine small fine needles; the strychnine precipitate when dry forms a crystalline asbestos-like felted mass. The lead chloride is not so delicate a test as the thioantimonate. A strong solution of sodium chloride completely precipitates bebeerine from its solutions.—*Amer. Jour. Phar.*, March 1884, 150–151, from *Jour. Chem. Soc.*, 1884, p. 120; *Chem. News*, vol. 48, p. 65.

Alkaloids—Constitution.—Professor Samuel P. Sadtler has delivered a very interesting lecture on “recent studies on the constitution of the alkaloids,” which appears to cover the ground very completely, and to which reference may be had in *Amer. Jour. Phar.*, Nov. 1883, 545–554.

Organic Bases.—Presence in *Commercial Amylic Alcohol*, which see under “Alcohols.”

Morphine—State of Combination in Opium.—In a paper read before the British Pharmaceutical Conference, 1883, Mr. D. B. Dott gives his reasons for believing that morphia exists in opium both as sulphate and meconate. Although sulphuric acid is present in opium in sufficient quantity to combine with the whole of the morphia, there are also other bases present with which it will unite in preference, and the residue of the acid is not sufficient to satisfy the whole of the alkaloid. On the other hand, meconic acid is not present in sufficient quantity to take up all the alkaloid, and probably forms an acid salt with the portion with which it does combine.—*Yearbook of Pharmacy*, 1883, 544–545.

Morphine—Combination with Acids in Opium.—D. B. Dott states that an aqueous extract of opium contains sulphuric acid sufficient, and meconic acid insufficient to combine with the whole of the morphine present; but it contains also inorganic and organic bases with which the sulphuric acid will unite in preference to the morphine, the remainder of this acid being not sufficient to combine with all the morphine. This alkaloid, therefore, exists in opium both as sulphate and meconate, possibly as acid meconate.—Amer. Jour. Phar., April 1884, 198; Phar. Jour. and Trans., November 17, 1883, pp. 389, 390.

Morphine.—Inaccuracy of the Germ. Pharm. Method of Assay in *Opium*, which see under "Materia Medica," p. 178.

Apomorphia—Value as an Emetic in Poisoning.—Dr. Routh ("Lancet," December 23, 1882) insists upon the great value of apomorphine in $\frac{1}{15}$ to $\frac{1}{4}$ grains as a ready and safe emetic in cases of poisoning. Emesis occurs in from two to five minutes, the contents of the stomach being voided in a rush, without previous nausea, but with visible action of the stomach.—Amer. Jour. Phar., Sept. 1883, from Gaillard's Med. Jour., April 7, 1883.

Hydrobromide of Codeine—Characters.—Mr. D. B. Dott describes this salt of codeine, which it appears has not previously been described, as follows: It crystallizes from an aqueous solution in radiate tufts of four-sided prisms. It is soluble in 82.5 parts of water at 60° F. It loses at the temperature of the water-bath one-fourth part of its combined water, and becomes anhydrous at some temperature (not exceeding 115° C.) above 100° C. In view of this its formula may be stated to be $C_{18}H_{21}N_2O_8, 2HBr, 4H_2O$.—Phar. Jour. and Trans., May 17, 1884, 917.

Phosphate of Codeine—Hypodermic Use.—Dr. Fronmuller employs the phosphate of codeia for hypodermic injection. He says that it possesses the advantage over the muriate and sulphate of being much more soluble. The substance crystallizes in slender, four-sided columns, is white in color, and of a bitterish taste, and is soluble in four parts of water. Its action is very like that of morphia, but it is milder, and the symptoms of poisoning (such as great weakness, intense headache, bilious vomiting, etc.) are much less often encountered. It seldom causes local irritation when subcutaneously injected. The dose should be at least double that of morphine. The phosphate of codeia is especially recommended in the case of women and children.—Amer. Drug., March 1884, 45.

Narcotine—Characters of its Salts.—Mr. David Brown Dott has prepared different salts of narcotine, and gives a resumé of the properties of the following salts, so far as our present knowledge goes: Meconate, acetate, hydrochlorate, and sulphate. The following is a brief abstract of the author's observations:

Meconate of Narcotine.—When narcotine and meconic acid are dis-

solved together in water, in molecular proportions, *i. e.*, two molecules of the base to one of the acid (which is di-basic), a syrupy solution is obtained, which refuses to yield crystals. If evaporated, the salt dries as a varnish. Unlike most amorphous salts this is not readily taken up by water. When the proportions for the acid meconate are used, a clear viscous solution is obtained. This ultimately becomes filled with crystals, but the author has not yet determined whether they are really a crystalline acid salt, or only the neutral salt separated with acid.

Acetate of Narcotine.—This was prepared by dissolving narcotine by the aid of heat in an excess of glacial acetic acid, several times the equivalent quantity of the latter being necessary. On cooling, the solution before long became filled with crystals, which were strongly pressed, first in calico, and then between blotting paper. The crystals were immediately bottled, and two portions weighed off as quickly as possible. One of these was mixed with ten times its weight of calcic hydroxide, and exposed in a water-bath, while in the other the narcotine was determined by precipitation with ammonia.

23.04 grs. lost in w.-b. 0.36 gr. = 1.56 per cent.

26.45 grs. treated with cold water left undissolved 24.28 grs. By NH_3 , 0.66 gr. was obtained in addition, making the total narcotine = 94.29 per cent.

	Calculated.	Found.
	+	
$(\text{C}_{22}\text{H}_{23}\text{NO}_7)_3 \cdot \text{C}_2\text{H}_4\text{O}_3 \cdot \text{H}_2\text{O}$	N 94.07	94.29
	H_2O 1.36	1.56

Whence it is probable that the salt obtained as just described has the above composition.

Hydrochloride of Narcotine is correctly described by Regnault and by Robiquet, but they make no mention of water of crystallization. Dr. Wright was the first who fully investigated this salt, and Mr. Dott's analysis leads to the same conclusion, that the normal hydrochloride has the composition $\text{C}_{22}\text{H}_{23}\text{NO}_7 \cdot \text{HCl} \cdot \text{H}_2\text{O}$. Strong solutions of this salt show a curious tendency to gelatinize, like the salts of cryptopia. The hydrochloride of narcotine may be regarded as its most important salt, being easily prepared and fully soluble.

Sulphate of Narcotine.—The author has not been able to find any published reference to this salt, which is readily obtained by dissolving narcotine with the theoretical proportion of sulphuric acid and allowing to crystallize.

The author's experiments would seem to indicate the sulphate of narcotine has the composition $(\text{C}_{22}\text{H}_{23}\text{NO}_7)_2 \cdot \text{H}_2\text{SO}_4 \cdot 4\text{H}_2\text{O}$, and that it loses one molecule of its water below 100°C ., the remainder at a higher temperature.

The meconate, muriate, and sulphate dissolve completely in water, and

their solutions remain clear even when largely diluted. Not so the acetate. By adding hot water to a solution of narcotine in dilute acetic acid, the greater part of the alkaloid is precipitated. One thing is noticeable regarding all salts of narcotine, that their solutions are *acid*, i. e., they behave as if they contained free acid.—Amer. Jour. Phar., March 1884, 152–156, from Phar. Jour. Trans., Jan. 26, 1884, 582.

Cinchona Alkaloids.—Percentages present in natural and renewed succirubra bark, which see under “Materia Medica,” p. 162.

Cinchona Alkaloids.—Assay in the *Extract of Red Cinchona Bark*, which see under “Pharmacy,” p. 64.

Cinchona Alkaloids—Preparation for Elixirs.—Prof. J. U. Lloyd gives the following method whereby many of the practical difficulties encountered in the preparation of the cinchona alkaloids for elixirs are overcome :

Alkaloid Quinine or Alkaloid Cinchonidine.

Sulphate of quinine or sulphate of cinchonidine	1 oz.
Distilled water.	32 fl. oz.
Ammonia water	$\frac{1}{2}$ oz.

Mix the ammonia water with the distilled water, and, having placed the sulphate of the desired alkaloid in a mortar, gradually triturate it with a sufficient amount of the liquid so as to form a thin, creamy mixture; then add the remainder of the mixed waters. Permit this to stand half an hour, and transfer to a filter paper; then after the precipitate has drained return it to the mortar, and mix it again with a liquid composed of

Distilled water.	32 fl. oz.
Ammonia water	$\frac{1}{4}$ fl. oz.

Permit the mixture to stand for half an hour, and then transfer it to a muslin strainer, squeeze it until the liquor is expressed, and then dry it by hanging it in the atmosphere, without, however, removing the strainer.

The foregoing process offers several advantages over the old, not the least being the ready production of an alkaloid in a porous and finely divided form. If the strainer is permitted to remain during the process of drying, the liquid carries the dissolved sulphate of ammonium to the surface as it evaporates, and deposits it upon the muslin.—New Rem., Oct. 1883, 309.

Quinine—Improvement of Ferrocyanide Test.—It is well known that a red color is produced in a liquid containing even traces of quinine if some chlorine water be added to it, then a few drops of fresh solution of ferrocyanide of ammonium, and, lastly, a little water of ammonia. The test may be improved, according to Vogel, if bromine water (which may

be prepared at a moment's notice) be used instead of chlorine water (which is difficult to keep and liable to spoil), and if a little carbonate of ammonium, or phosphate of sodium, or borax, be added after the ferrocyanide.—New Rem., Dec. 1883, 366.

Quinine—Percentage in its Different Salts.—According to Tanret, the salts of quinine in common use contain the following proportions of the alkaloid :

	Per cent.
Acetate	87.34
Hydrate (quinine precipitated and dried)	85.70
Basic chlorhydrate	81.60
Lactate	78.26
Basic bromhydrate	76.60
Valerianate	76.05
Basic sulphate (the ordinary sulphate)	74.30
Sulpho-vinate	72.00
Neutral bromhydrate	60.00
Neutral sulphate (or acid sulphate)	57.24
Tannate.	20.60

—Detroit Lancet ; Amer. Drug., June 1884, 114.

Quinine—Combination with Chloral.—Dr. Mazzara calls attention to a compound of quinine with chloral, which he believes is but the beginning of a number of similar compounds of chloral with other alkaloids. To a solution of quinine in chloroform an equivalent quantity of chloral is added, and, after thorough admixture, spontaneously evaporated. The residue is taken up with stronger ether, and, on being gently warmed, a separation of white warty crystals begins, and the liquid speedily becomes a crystalline paste. Another method described is to dissolve 32 parts anhydrous quinine in chloroform, add some anhydrous ether, then 147.5 parts of chloral, and gently warm. Wash the crystals slightly with cold ether, and dry over sulphuric acid. The crystals are snow-white, nearly tasteless, but, after a little, developing bitterness. At the temperature of 149° C. in dry air, the salt volatilizes without change. In a dilute acid solution it has the characteristic fluorescence and thalleioquine reaction of quinine ; does not show any chlorine reaction when treated with sodium bicarbonate. Its chemical composition is $C_{20}H_{24}N_2O_2CCl_3COH$. The solution in water is not believed to be stable, and a dilute acid is thought necessary to be added.—Phar. Rec., Jan. 15, 1884, 45, from Chemist and Druggist.

Sulphate of Quinine—Preparation in Absolutely Pure State.—According to Dr. DeVrij, the most practical method of preparing absolutely pure sulphate of quinine is to start from the so-called bisulphate of quinine, which can indeed be obtained in a chemically pure condition from different quinine factories, according to his experience. One part of this salt is dissolved in forty parts of hot water, and to the boiling solu-

tion enough solution of soda is added until very sensitive blue paper is just barely rendered faintly red. The pure basic sulphate of quinine will then separate from the solution, upon slow cooling, in handsome, transparent needles.—Amer. Drug., April 1884, 73, from Nieuw Tijdschr. v. d. Pharm., Feb.

Sulphate of Quinine—Presence of Fungi.—Mr. Brunnengräber draws attention to the occurrence of a fungoid growth in sulphate of quinine. The fungoid proved to be *Aspergillus glaucus*, and appears most beautiful under the microscope. It was observed in all samples of sulphate of quinine from various factories. His explanation of this peculiar phenomenon is as follows: In the manufacture of sulphate of quinine the adherent water has a quinine value, hence manufacturers dry the salt at as low a temperature as possible. In drying it they probably spread it on linen or cotton cloth, and any spores of fungi formed while drying attach themselves to the linen fibres, and are scraped off with the crystals. The author attributes the instability of quinine solutions to the presence of the spores of this fungus; these spores are killed by boiling, hence, to make permanent solution, the solution should be boiled and filtered.—Drug. Cir., September 1883, 131, from "Rundschau" (Leitmeritz.)

Sulphate of Quinine—Incompatibility with Iodide of Potassium.—M. Rabuteau calls attention to the ill effects of iodide of potassium and sulphate of quinine, when administered together or at short intervals. These effects are, on the part of the digestive organs, anorexia, nausea, epigastric pain, colic, and sometimes vomiting; on the part of the general system, *malaise*, slowing and feebleness of the pulse, pallor, and a sense of fatigue. These results are due to the decomposition of the iodide and the liberation of free iodine. This decomposition takes place, not alone in the stomach, but goes on in the intestine also. The same result occurs from the use of an iodide sophisticated with an iodate of potassium. Iodine is set free, and to the action of this is to be referred the local and systemic effects above mentioned.—Amer. Jour. Phar., June 1884, 340, from Med. News; Lancet and Critic, March 1.

Sulpho-Tartrate of Quinine Glycyrrhized with Coffee.—Under this name Dr. Pavesi describes a new preparation of quinine, in which the bitterness is masked to such an extent as to enable its administration to children, while the quinine remains unaltered. It is prepared as follows:

R. Sulphate of quinine	1 part.
Tartaric acid	1 part.
Powdered licorice root	5 parts.
Powdered roasted coffee	25 parts.
Water, q. s.	

The coffee and licorice root are mixed with sufficient hot water; the limpid and brown liquid (filtrate? Rep.) obtained is evaporated to a syr-

upy consistence, the quinine and acid are added, dissolved, and the whole is then evaporated at a gentle heat to dryness, and powdered. The new substance constitutes a brownish hygrometric powder, which must be preserved in well-stoppered bottles. It is soluble in water, and has a bitter-sweet, not disagreeable, taste.

Syrup of Sulpho-Tartrate of Quinine with Licorice and Coffee is obtained by evaporating the above to a syrupy consistence instead of to dryness, having previously added to the decoction 50 grams of sugar.—Drug. Circ., Jan. 1884, 4, from Gaz. Med. di Torino.

Tannate of Quinine—Analysis.—In the course of a paper on the preparation and analysis of tannate of quinine, Mr. Mathias Rosznyay, of Arad (Hungary), makes an important statement regarding the analytical process recommended by many prominent authorities, among them Hager. The latter namely recommended to mix 1 gm. of the tannate of quinine with 10 gms. of finely powdered oxide of lead and water to a paste, which is to be dried and then to be extracted with alcohol, which is supposed to separate the alkaloid, leaving tannate of lead behind. Rosznyay, however, found that the alcohol always extracted the unaltered tannate of quinine. On evaporating the alcohol, the residuary mass was tasteless, and had in no case the bitter taste of quinine, which led him to judge that the expected decomposition did not take place. He therefore had recourse to a method based on that which is used for analyzing cinchona barks. A mixture of two gms. of tannate of quinine and 6 gms. of fresh hydrate of calcium was made into a thin paste with 10 cubic centimeters of a 25 per cent. solution of caustic soda, and the whole carefully evaporated on the water-bath. The resulting dry mass was powdered, transferred to a small continuous displacement apparatus, and completely exhausted with chloroform, which was judged to be the case when a drop of the percolate no longer left a visible residue after evaporation from a clean glass. The solution was transferred to a carefully tared porcelain capsule, the latter covered with a piece of blotting paper, and set aside so that the latter could evaporate spontaneously. Finally, the capsule was heated for some time at a temperature of 40° C. (104° F.) until all the chloroform was dissipated. Lastly, the capsule was weighed with its contents of hydrate of quinine, appearing as a white resinous substance.—New Rem., Sept. 1883. 274, from Gyógysz. het. and Rundschau (Leitmeritz).

Tannate of Quinine—Solubility in Gastric Juice.—Mr. E. C. Field remarks that there are two varieties of tannate of quinine, one the tasteless tannate, the other the ordinary tannate obtained by precipitating the sulphate dissolved in dilute sulphuric acid, and which contains traces of the sulphate. The salt used in these experiments was made by the formula given in the Handbuch der Pharmaceutischen Praxis, Vol. II., 1,331, and gives a yield of forty parts of the tasteless tannate from 10 parts of the sulphate. Mr. Field used as a solvent, in four trials, two

tenths per cent. solution of hydrochloric acid. In two trials artificial gastric juice was made by dissolving in 200 cc. of a two-tenths per cent. solution of hydrochloric acid 4.147 grammes (64 grains) of pepsin, making a solution warranted by the manufacturers of the pepsin to dissolve 768 grains of freshly coagulated albumen, but which, on trial, was found capable of dissolving only one-twelfth as much. In two other experiments real gastric juice obtained by means of a canula from a healthy dog was employed.

Omitting the details of the experiments, which also included the administration of the drug to the human subject, the writer considers it clearly proven that the tasteless tannate of quinine as a medicine, is nearly and practically inert, and even if a strong digestive juice should be able to dissolve a minimum dose of eight grains (corresponding to two grains of the sulphate) the individual for whom the juice acted would receive the effect of about six grains of tannin, which might be the last effect desired.—*Amer. Drugg.*, Mar. 1884, 49.

Tannate of Quinine in Mixtures.—See *Mistura* under “Pharmacy,” p. 84.

Compound of Quinine and Quinidine—Further Characters.—In a former paper (see *Proceedings* 1882, 413) C. H. Wood and E. L. Barret had described this compound, originally observed when working with cuprea bark. They have since investigated the subject more closely, and publish their results. In the first case, equal quantities of quinine and quinidine sulphates were dissolved separately in acidulated water, the solution shaken with ether, excess of soda added, and the whole agitated. As soon as the precipitates had dissolved in the ether, the ethereal solutions were decanted off and mixed. The crystals deposited from this mixed solution yielded, on analysis, numbers approximating to the composition 1 mol. quinine + 1 mol. quinidine + $2\frac{1}{2}$ H₂O. In another experiment, equal weights of the alkaloids were dissolved together in 50 per cent. spirit. The crystals obtained from this solution, after 48 hours' exposure over sulphuric acid, were similar in constitution to those described above; whilst in a third experiment, equal weights of the two sulphates were dissolved, etc., as in the first experiment, but the alkaloids were taken up with warm benzene. This time the crystals, even after three days' exposure, were found to contain 1 mol. quinine + 1 mol. quinidine + 2H₂O + C₆H₆. From these facts the authors infer that the crystals always contain water, and therefore this compound is a hydrate of the two alkaloids.

When anhydrous, a mixture of quinine and quinidine has a lower melting point than either of the constituent alkaloids. Some of the anhydrous double body dissolved in dry benzene has deposited only a very few crystals, after remaining corked up ten days, but on removing the cork, and exposing the contents of the flask to the air, plenty of crystals

soon formed ; and in two days the solution was half filled with them. Quinine, prepared from the sulphate, when dissolved in warm benzene, forms rhomboidal crystals of the composition 2 mols. quinine + $2\text{H}_2\text{O}$ + C_6H_6 . They lose the benzene slowly ; a sample, after being kept for some time, had lost all odor of benzene, but gave evidence of the presence of the hydrocarbon when treated with an acid. The authors remark on the analogy these crystals bear to those of the quinine and quinidine compound when crystallized from the same menstruum. When anhydrous quinine is dissolved in dry benzene, it crystallizes out in needles containing a large quantity of benzene, which is gradually given off until only 1 mol. benzene is retained. Cinchonidine crystallizes from benzene without water, but with 1 mol. benzene, with which it readily parts. The benzene employed in these experiments was carefully purified. The authors further recommend the following

Test for the Purity of Quinine.—0.7 gram of the quinine sulphate to be tested is dissolved in 20 drops of hydrochloric acid and 7 cc. of water ; 7 cc. of benzene are added, and the whole warmed, and then shaken up with $3\frac{1}{2}$ cc. of dilute ammonia. The benzene layer is separated, the quinine hydrate allowed to crystallize out and filtered off ; the separation of feathery crystals then indicates the presence of cinchonidine. These crystals contain a large quantity of quinine. Less than one per cent. of cinchonidine can be recognized in this way. The crystals must be sought for within the liquid, not on the surface. The quantities and method of procedure given above must be strictly followed in order to ensure success. Absolutely pure benzene is not necessary for this test : the benzene should, however, crystallize when placed in a freezing mixture.—*Jour. Chem. Soc.*, Nov. 1883, from *Chem. News* [48], 4 ; *Amer. Jour. Phar.*, Jan. 1884, 43-44.

Napelline—Therapeutic Uses.—This amorphous alkaloid of aconite root has been successfully used by Laborde to relieve neuralgia pains, and as a substitute for morphine in a case of the morphine habit. It was given hypodermically in doses of from one to four centigrams in the twenty-four hours.—*Jour. de Therapeut.* ; *Louisville Med. News* ; *Amer. Jour. Phar.*, Jan. 1884, 45.

Benzoate of Cinchonidine—Preparation.—Mr. Byasson communicates the following formula :

Sixty parts of benzoic acid are dissolved in two hundred parts of alcohol, and poured into a porcelain vessel containing three thousand parts of boiling distilled water.

Dissolve two hundred parts of cinchonine sulphate in two thousand parts of water, using sufficient diluted sulphuric acid to effect the solution. Precipitate with ammonia, and wash with a small quantity of cold water. Add the moist precipitate of cinchonidine to the hot solution of benzoic acid, and filter while hot. The solution must be made faintly alkaline by cautious addition of ammonia.

On cooling, the cinchonidine benzoate separates in form of small, thin, prismatic needles, resembling cinchonidine sulphate. On evaporation of the mother-liquor, a second crop of crystals forms, which may be added to the former, and then sparingly washed with cold water. The yield is about two hundred parts.—Phar. Rec., Jan. 15, 1884, 45.

Cinchonamine—Characters of its Salts, etc.—In addition to his previous observations (see Proceedings 1882, 415–416), Mr. Arnaud communicates the following in reference to the salts of cinchonamine: The salts of cinchonamine generally crystallize readily, and are but slightly soluble in water, especially in presence of free acid. They dissolve in hot alcohol, from which they crystallize on cooling. The *hydrochloride* crystallizes from an acid solution in thin, brilliant, anhydrous, prismatic lamellæ, very slightly soluble in acidulated water. From a neutral aqueous solution, the salt crystallizes in opaque flattened prisms containing 1 mol. H_2O . These crystals effloresce, and are much more soluble in water than the anhydrous salt. This property of the hydrochloride to crystallize in an anhydrous condition from acid solutions furnishes a method of separating cinchonamine from all the alkaloids with which it is associated in *R. purdiana*. The *hydrobromide* forms brilliant, slender, anhydrous needles, slightly soluble in cold water, much more soluble in hot water. The *hydriodide* crystallizes in micaceous plates, almost insoluble in cold water. The *nitrate* is only slightly soluble in cold alcohol, but is much more soluble in hot alcohol, from which it crystallizes in hard, thick, short prisms. This salt is slightly soluble in pure water, but is insoluble in acidulated water, and is precipitated on adding nitric acid to even a dilute aqueous solution of any cinchonamine salt. The precipitate is at first flocculent, but on standing it rapidly becomes crystalline, the crystals being small prisms, which polarize light. At 15° , 100 parts of alcohol of 94° dissolve 0.825 part of the salt; 100 parts of water at the same temperature dissolve 0.2 part of salt. The *sulphate* can be purified by crystallization from alcohol. A solution of the salt in water containing 1 mol. H_2SO_4 has a rotatory power at 15° $[\alpha]_D = +43.5$; at 25° $[\alpha]_D = +42.2$. The *formate* crystallizes with difficulty. The *acetate* is very soluble in water, from which it is deposited as a resinous mass on evaporation. By spontaneous evaporation of the aqueous solution the salt is obtained in deliquescent crystalline concretions. The *oxalate* does not crystallize from an aqueous solution, but is deposited in a resinous form. The *tartrate* forms a crystalline powder consisting of small hexagonal prisms which polarize light. 100 parts of water at 15° dissolve 1.150 parts of the salt. The *malate* forms brilliant nacreous plates, very slightly soluble in cold water, but somewhat soluble in boiling water. The crystals retain 1 mol. H_2O at 120° , but melt and become anhydrous at 160° . 100 parts of water at 15° dissolve 1 part of malate. The *citrate* is deposited from a boiling solution on cooling as a resinous mass, which

gradually becomes crystalline, forming concretions composed of brilliant prisms which polarize light. 100 parts of water at 16° dissolve 1.950 parts of the citrate.—Amer. Jour. Phar., March 1884, 156–158; Jour. Chem. Soc., 1884, p. 87; Comp. Rend. vol. 97, p. 174.

Strychnine—Solubility.—Mr. P. Crespi has determined the solubility of strychnine at ordinary temperatures, and at 56°, 78°, and 98.5° in various solvents. He finds that 1 part of water at 14.5° dissolves 0.025 part of strychnine; that 1 part absolute alcohol dissolves from 0.302 to 0.325 at 8.25° and 10.75°; 0.965 at 56°, and 1.845 at 78°; that amyl alcohol, one of the best solvents, dissolves 0.525 at 11.75°, and 4.262 at 98.5°; that its solubility in dilute alcohol increases with the proportion of water up to 85° of Gay-Lussac's areometer, and diminishes at greater dilution.—Amer. Drug., May 1884, 95, from Gaz. Chim. It., 13, 175.

Strychnine—Paraldehyd an Antidote.—From some observations of Professor Cervello (Arch. Scie. Med., vol. ii., No. 1), it seems that paraldehyd possesses properties antagonistic to strychnine. Thirty-seven and a half grains of the former completely antagonized $\frac{1}{8}$ of a grain of nitrate of strychnine given to a rabbit. The converse action does not seem to exist, for strychnine has no influence on paraldehyd narcosis. Amer. Jour. Phar., Feb. 1884, 83, from Med. and Surg. Reporter.

Strychnine.—Presence in Legen. See under "Materia Medica," p. 202.

Strychnine and Brucine—Quantitative Separation.—Messrs. Wyndham R. Dunstan and F. W. Short have devised a process for the separation of the two alkaloids, which is based upon the difference in the solubility of the ferrocyanides of strychnine and brucine, produced by the double decomposition of the alkaloidal sulphates and potassium ferrocyanide. Strychnine ferrocyanide is but very slightly soluble in water, whilst brucine is much more soluble; but it has been found that in neutral solution a larger quantity of the strychnine salt remains in solution if the brucine salt be present, and in alkaline solutions the separation is not so complete as is desirable. If, however, the solution of the sulphates be acidified with sulphuric acid, the strychnine is entirely precipitated by potassium ferrocyanide, both alone and in the presence of brucine, the brucine not being precipitated under similar conditions until the strength of the solution approaches saturation, and then slowly and in large silky needles, differing from the granular and heavy precipitate of the strychnine salt.—Yearbook of Pharmacy, 1883, 469–475.

Aconitine—Duquesnel's Process.—Dr. J. V. Laborde and H. Duquesnel have recently (1883) published a work on aconite and aconitines, from which a brief abstract is made in "New Remedies" (Sept. 1883, 265–266). Duquesnel's process for the preparation of "crystallized aconitine" has been modified in some important particulars. By reference to

that process (Proceedings 1882, 428), it will be noted that the aconite tubers are extracted with alcohol containing tartaric acid; the alcohol is distilled off, the residue diluted with water, the clear filtrate, treated with bicarbonate of potassium, and then extracted by repeated shaking with ether. In the modified process, instead of distilling the ethereal liquids, the latter are shaken with a ten-per-cent. solution of hydrochloric acid, which takes up the alkaloids, leaving the ether free and available for the next operation. After four or five successive agitations, the ethereal liquid may be considered sufficiently exhausted, as was proved by physiological experiments. The hydrochloric liquids are saturated by chalk, in order to avoid the prolonged and injurious action of the acids upon the principal alkaloid, the crystallized aconitine. Next they are evaporated at a gentle heat (from twenty-five kilograms of root, the liquid amounted to three hundred cubic centimeters), filtered, and while they are still warm mixed with a solution of *nitrate of sodium* (containing two parts of the salt in three parts of water) of the same temperature, about 45° C.

The whole is allowed to cool slowly during several hours, and, at the end of this period, the bottom of the vessel will be found incrustated with numerous and voluminous crystals. After several days' rest, during which the crystals increase very slightly in quantity, the liquid is filtered off.

This filtrate now contains only traces of the crystallized alkaloid, but it contains other principles which may be separated as follows:

The filtrate is treated with ammonia in a very slight excess; this produces a flocculent precipitate, which is *insoluble* in water, and causes tingling of the fauces, like aconitine.

The precipitate is separated by filtration, and the filtrate evaporated, after having been treated with tartaric acid in very slight excess. Whenever the nitrate of sodium, which is present in very large quantity, begins to crystallize out, the whole is allowed to cool, and a *very small* excess of ammonia is added. This causes a new and abundant precipitate which, on being stirred, coalesces to a resinous, brownish mass, *soluble in water*, and possessing a bitter taste, but without causing tingling like aconitine.

By a renewed concentration and similar treatment, further quantities of this water-soluble substance may be obtained.

According to Laborde and Duquesnel, therefore, aconite root (besides other less important constituents) contains the following:

a. A crystalline alkaloid, about 1.50 grams per kilogram of root, but liable to vary from 0.50 to 4 grams, according to the roots.

b. An amorphous, insoluble substance, weighing only a few grams, and producing tingling of the fauces like aconitine.

c. An amorphous, soluble substance, weighing about fifteen grams, of a bitter taste.

Now, while these two last-named principles are quite inferior to real

aconitine, they are nevertheless of interest. They possess special therapeutic properties, differing in degree (and possibly in kind) from aconitine, and undoubtedly modifying the properties of the latter when mixed therewith. The precipitate (*b*) produced by slightly super-saturating the first mother-water with ammonia, and subsequently treated with water acidulated with nitric acid, yields, on evaporating this acidulous solution, numerous crystals of nitrate of aconitine similar to those which are produced by nitrate of sodium; afterwards there is separated an uncrystallizable salt much more soluble, having the same taste, and precipitated by ammonia even from a dilute solution. This precipitate, thus produced by ammonia, is amorphous, refusing to crystallize in the ordinary solvents of aconitine, and insoluble in water. Its taste is that of the crystallized aconitine, of which it always retains traces. This substance has already been isolated by other, though by less simple means; Laborde and Duquesnel propose to name it "amorphous aconitine."

In fact, it has been observed that most plants which contain alkaloids, or active *crystallizable* principles, contain, besides these, certain amorphous principles more or less resembling the former. Examples are digitalis and cinchona. [The authors add, that they are at present in regular receipt of aconite roots of known age from Switzerland, and that they are engaged with a series of experiments, to be continued as long as practicable, with a view to ascertain the relative proportion of alkaloids in the root at different periods of its age.]

The amorphous soluble substance (*c*), which is obtained in form of glassy scales, does not appear to be of much importance, at least therapeutically. The authors consider it to be identical with the alkaloid napelline heretofore observed by others.

The principal alkaloid obtained by the authors is the above-mentioned "crystallized aconitine," which is, however, in the form of nitrate when extracted by the method before described. The alkaloid itself is obtained by mixing the nitrate with bicarbonate of potassium or ammonium in very slight excess, and agitating for some time with chloroform. The latter is decanted, filtered, and distilled off, when a syrupy liquid will be left behind, which soon crystallizes. The crystallization may be hastened if about an equal volume of alcohol be added to the mass (syrupy liquid, or previous to distillation?).

The employment of nitrate of sodium, in the process above described, is one of the most important improvements, since it does away with the use of nitric acid, which always results in turning the color of the product, and possibly alters its constitution.

The authors add that this method of preparing aconitine is only successful in the case of those aconites which furnish *crystallizable* nitrates, such as *Aconitum Napellus*, *A. neomontanum*, *A. pyrenaicum*, etc. It cannot be advantageously employed for *Aconitum ferox*, the alka-

loid salts of which are not crystallizable, nor for *A. Anthora*, from which the authors have been unable to obtain any other but amorphous substances.

Aconitine—Proper Character for Internal Administration.—Mr. T. B. Groves, speaking of aconite and its preparations, cautions against the use of any other than the roots of *Aconitum Napellus* for the preparation of aconitine intended for internal use. It is unquestionable that the roots of *A. ferox* are and have been used for the preparation of commercial aconitine, yielding a product which is largely composed of fer-aconitine (the so-called pseudo-aconitine of Von Schroff). The physiological action of this variety of aconitine is, however, quite distinct from that of nap-aconitine, and whilst it is associated with the crude alkaloid obtainable from *A. Napellus*, the nap-aconitine is readily obtained in a pure condition from the crude alkaloid by conversion into nitrate; the nitrate of nap-aconitine crystallizing from neutral or nearly neutral liquids, whilst the nitrate of fer-aconitine is only crystallizable from a strongly acid solution. There remains the possible admixture of picraconitine (the alkaloid of *A. paniculatum*), the nitrate of which crystallizes in forms so like those of nap-aconitine that by an ordinary observer they would not be distinguishable. Its bitterness is its most potent distinction. It is important therefore that some method, microscopic or otherwise, should be devised for the certain distinction between the roots of *A. Napellus* and *A. paniculatum*. With true roots of *A. Napellus* at command, there is no difficulty to prepare aconitine of reliable purity.—Phar. Jour. Trans., Nov. 17, 1883, 397.

Atropine—New Process of Preparation.—The following process is given in "Chem. Centralbl." (No. 111, 180): 1000 grams of powdered belladonna root or leaves are moistened with 84 per cent. alcohol, packed in a displacement apparatus, and sufficient alcohol of the above strength added to make 1000 cc. After macerating 24 hours, 250 cc. 84 per cent. alcohol are added, percolation allowed to proceed, and this repeated every four hours until the drug is exhausted. It is then percolated with water to drive out the remaining portions of alcohol, the alcohol distilled off from the mixed percolates, and the residual extract mixed with five times its volume of water, and filtered. The resin and fat-like extractives are carefully washed with water evaporated to a measure of 300 cc., and supersaturated with ammoniac hydrate. The excess of ammonia is allowed to evaporate by allowing the liquid to stand exposed to the air for an hour or more. The mixture is then agitated with ether, and the ethereal solution washed with water acidulated with acetic acid, by which means the atropia is extracted, and the ether can be used again for a fresh agitation. The acetic solution is mixed with animal charcoal, filtered, evaporated to small bulk, and treated anew with ether and ammonia. From the ethereal solution there is separated, upon spontaneous

evaporation, the alkaloid in the form of nearly white crystals, which are rendered completely white by one or two recrystallizations. It is very important that no alcohol be left in the extract, and that upon shaking with ether, the ether be selected which is absolutely free from alcohol.

Atropine—Constitution.—Professor A. Ladenburg has communicated a paper to "Annalen" (217, 74-149), in which he has collected together the various facts on the subject of the constitution of atropine, mostly already published and abstracted, and thus gives a historical sketch of this interesting research. The importance of the subject will justify the reproduction of an abstract of this paper (from Jour. Chem. Soc., through Amer. Jour. Phar., Sept. 1883, 463-465) in this report.

When tropine had been recognized as a tertiary base, the author proceeded to synthesize atropine from its products of decomposition, tropine and tropic acid, which he succeeded in doing by the action of dilute hydrochloric acid on tropine tropate. This being accomplished, he next prepared various other alkaloids, called by him tropeines, by a similar method; thus, from tropine mandelate he obtained *homatropine* or *phenylglycolic tropine* and measurements of the crystals, and the following additional observations are now given: the *hydrochloride* crystallizes from concentrated neutral solutions after some time; it is very soluble in water; the *sulphate* can be crystallized from water, and forms needles with silky lustre; solutions of the hydrochloride give a white, curdy precipitate with potassium mercuric iodide, a white oil with mercuric iodide, and a crystalline *platino-chloride* with platinic chloride. From tropine atrolactate, *atrolactic tropeine* is obtained. Additional remarks: this substance crystallizes in needles (m. p. 119-120°), very sparingly soluble in cold, but more readily in hot water, and easily in alcohol. It is isomeric with atropine, and its mydriatic action is equally remarkable. The hydrochloride, hydriodide, hydrobromide and sulphate have not been obtained in crystals. The *platinochloride* forms reddish-yellow crystals, very soluble in water and alcohol. The *aurochloride*, $C_{17}H_{23}NO_3 \cdot AuCl_4 \cdot H$, crystallizes in yellow needles, which melt under water, but when dry melt at 112-114°, sparingly soluble in cold water. *Salicylic tropeine*, $C_{18}H_{19}NO_3$, is obtained from tropine salicylate; it does not act on the pupils of the eye; the platinochloride has the composition $(C_{18}H_{19}NO_3 \cdot HCl)_2 \cdot PtCl_4$, the *aurochloride*, $C_{18}H_{19}NO_3 \cdot HCl \cdot AuCl_3$. *Hydroxybenzo-tropeine* can be partially distilled without decomposing, whilst the remainder is carbonized. It has a slightly alkaline reaction, and is soluble both in acids and in soda. It crystallizes without water of crystallization. It does not act on the eye as energetically as atropine. The *nitrate* is moderately soluble, and is colored yellow when boiled with excess of nitric acid. Iodine gives rise to a crystalline mixture of tri- and pentiodide. The *mercuro-* and *stanno-chlorides* have been obtained, the former in colorless leaflets, the latter in tufts of white needles. Other

precipitates are formed with tannic acid, potassium mercuric iodide, potassium ferri- and ferro-cyanide, and phosphomolybdic acid. The simple salts of *parahydroxybenzotropeine*, $C_{16}H_{18}NO_2$, are mostly soluble, the *nitrate* crystallizing in prisms only sparingly soluble; this salt is turned yellow by boiling with nitric acid. It gives precipitates with all the various reagents mentioned above; the *mercurochloride*, $HgCl_2, C_{16}H_{18}NO_2, HCl, H_2O$, crystallizes in needles.

Benzotropeine, $C_{15}H_{19}NO_2$. Additional remarks: it distils without leaving a residue. The *nitrate* is sparingly soluble, and is turned yellow by boiling with nitric acid. The *aurochloride* forms microscopic needles, slightly soluble in water, easily in alcohol. It gives precipitates with the usual reagents. *Phenylacetropine*, $C_{16}H_{21}NO_2$, sulphate forms colorless needles. *Cinnamyl tropeine*, $C_{17}H_{21}NO_2$, can be prepared either from cinnamic acid, tropine, and hydrochloric acid, or by treating phenylacetic acid in a similar manner. It has scarcely any mydriatic action, but is a powerful poison. *Atropyltropine* and *phthalyltropine* are the last of the series of the compounds described in this paper. The author then passes on to his work on the constitution and synthesis of tropic acid, from the results of which he arrives at the constitution $CH_2(OH).CHPh.COOH$ for that acid. With regard to the constitution of tropine, the author finds that when it is heated with soda-lime, *methylamine* and a *hydrocarbon* like tropilidene, C_7H_8 , stand prominent amongst the products, so that the principal reaction may be represented by the equation $C_8H_{15}NO = NH_3, CH_3 + C_7H_8 + H_2O$. When tropine is decomposed with acids, it gives rise to *tropidine*; the best method for the preparation of this base is to heat a mixture of tropine (2 parts), glacial acetic (12 parts), and concentrated sulphuric acid (46 parts). In addition to the properties, etc., already given, the vapor density has been determined, and found to be 118. Tropidine is soluble in acids, in ether and alcohol, scarcely soluble in soda; its aqueous solution has a strongly alkaline reaction. *Tropidine hydrochloride* forms hygroscopic crystals, soluble in water. The *hydrobromide* is similar, but not quite so hygroscopic. The *picrate* crystallizes in yellow needles, very sparingly soluble in cold, somewhat more so in hot water. The *periodide* forms brown prisms (m. p. $92-93^\circ$), soluble in alcohol. With methyl or ethyl iodide, tropidine yields a mono-methyl or ethyl-derivative, which is crystalline, and forms well-defined crystalline platino- and auro-chlorides. The action of hydriodic acid and phosphorus on tropine results in the formation of *hydro-tropine iodide* (m. p. 115°); if, however, during the reaction, the tube be heated to 150° or above, tropidine and its periodide are the products, owing to a secondary dehydrating reaction resulting in the conversion of tropine into tropidine. The formation of *metatropine* from hydrotropine iodide is then discussed, and the conclusion arrived at is that tropine is a nitrogenous alcohol, of which the tropeines are the ethereal derivatives.

This view is supported by the author's work on alkines, which are a class of bodies quite analogous to the tropeines. Then follow detailed accounts of the following experiments: Decomposition of dimethyltropine by heat; the production of tropilene from methyltropidine iodide, and tropiledene from dimethyltropine iodide; the decomposition of methyltropine, methyltropine chloride and iodide by potash, the principal products being large quantities of *di-* and small of *tri-methylamine*; the oxidation of tropilene into adipic acid, and finally the decomposition of tropidine by bromine, by which *ethylene dibromide* and *dibromomethylpyridine* are obtained. The inferences there deduced are enlarged upon, and the formula $C_8H_7(C_2H_4O.CO.CHPh.CH_2.OH)NMe$, proposed for atropine.

Atropine and Other Mydriatic Alkaloids — New Reaction.—Whilst studying the behavior of atropine towards mercuric chloride, Mr. A. W. Gerrard was surprised to find on mixing hot alcoholic solutions that they gave a yellow precipitate, which on boiling became red. On diluting the mixture with water a further amount of yellow precipitate was obtained, which also changed to red on boiling.

The precipitate separated, washed and dried, was found on analysis to be mercuric oxide, with a small trace of mercurous oxide. The above experiment was repeated on hyoscyamine, daturine, duboisine, and homatropine, with the same result, thus affording additional proof of the unity of the mydriatic alkaloids.

Expecting to find other alkaloids to react in a similar manner, the same test was applied to as many alkaloids as were at his disposal; in no case did he obtain a red precipitate. The following were examined: Strychnia, brucia, morphia, codeia, veratria, aconitia, conia, gelseminia, coffea, theia, cinchonia, cinchonidia, quinia, and quinidia. With most of these he obtained white precipitates; the codeia and morphia became pale yellow on boiling; in many cases crystals of apparently new combinations separated.

For practically working the test, he recommends the following procedure: To a small portion of atropine in a test tube, add about 2 cc. of a 5 per cent. solution of mercuric chloride in 50 per cent. alcohol and warm gently; the precipitate will at once appear, and become brick-red in color. Like most alkaloidal reactions, he finds there are certain limiting conditions necessary for the success of the test. It does not answer in dilute solutions, neither does it turn out well if the atropine be added to the mercury, but working as he has described the reaction is strongly marked.

In forensic analysis the above test will be of value, as hitherto no reliable chemical test for atropine has been known. This communication also shows, that under certain conditions, atropine, contrary to the general statement, behaves towards mercuric chloride not like ammonia, but

similar to the hydrates of the alkali metals.—Amer. Jour. Pharm., April 1884, 206–208; Pharm. Jour. and Trans., March 8, 1884, p. 718.

Atropine and Hyoscyamine—*Estimation in Belladonna Root*, which see under “Materia Medica,” p. 134.

Caffeine—*Action of Hydrochloric Acid, etc.*—Mr. E. Schmidt considered it possible that theobromine might be formed by the action of hydrochloric acid upon caffeine, with elimination of a methyl-group. No reaction, however, takes place below about 240° , the caffeine then decomposing, with formation of carbonic anhydride, ammonium chloride, methylamine hydrochloride, sarcosine hydrochloride, and traces of formic acid, $C_8H_{10}N_4O_2 + 6H_2O = 2CO_2 + 2MeNH_2 + NH_3 + CH_2O_2 + C_8H_7NO_2$. The reaction is effected in sealed tubes, the temperature being maintained at 240 – 250° for 6–12 hours; above 260° the product becomes partially carbonized. The caffeine employed was the pure product obtained from tea. The methylamine hydrochloride is separated and purified by means of its platinochloride, which crystallizes partly in lustrous yellow plates, and partly in orange-red rosette-like groups. The sarcosine was identified by means of its copper salt $(C_8H_7NO_2)_2Cu, 2H_2O$, sarcosine obtained by the action of barium hydroxide on caffeine yielding a perfectly similar salt. These results show that caffeine yields the same products by the action either of hydrochloric acid or of barium hydroxide, except that in the former case the intermediate product, caffeidine, is not produced. Theobromine is decomposed by hydrochloric acid, with formation of the same products as in the case of caffeine, but the proportion of ammonia to methylamine is in this case two molecules of the former to one of the latter, showing that the additional methyl-group in the caffeine must be united with a nitrogen atom. The fact that only one of the nitrogen atoms in caffeine can be eliminated, as ammonia is in accordance with the formula given by Fischer (“Annalen,” 215, 314), and “Medicus” (*ibid.*, 175, 250), but is not explained by Strecker’s formula (*ibid.*, 118, 171).

The author has also very carefully compared artificial caffeine as prepared by Strecker (*loc. cit.*) with natural caffeine obtained from tea. His results confirm those previously obtained by Strecker, a comparison of the following salts proving that artificial and natural caffeine are identical. The *hydrochloride*, $C_8H_{10}N_4O_2, HCl, 2H_2O$, forms colorless monoclinic crystals, which give off hydrochloric acid and water by exposure to air, leaving pure caffeine, the same change taking place rapidly at 100° , or by the action of water or alcohol. The *platinochloride*, $(C_8H_{10}N_4O_2)_2, H_2PtCl_6$, crystallizes in small rosette-like groups of needles, and contains variable amounts of water. *Caffeine aurochloride*, $C_8H_{10}N_4O_2, HAuCl_4, 2H_2O$, forms lustrous gold-colored plates. *Caffeine methiodide*, $C_8H_{10}N_4O_2, MeI, H_2O$, is formed when caffeine is heated for some hours at 130° with an excess of methyl iodide in sealed tubes, and

may be purified by washing with cold alcohol and crystallizing from water, in which it is moderately soluble, although but sparingly so in alcohol, and almost insoluble in ether.—*Jour. Chem. Soc.*, Sept. 1883; *Annalen*, 217, p. 270; *Amer. Jour. Phar.*, Jan. 1884, 46-47.

Caffeine.—Occurrence in cacao along with theobromine. See *Cacao* under "Materia Medica," p. 171.

Citrate of Caffeine—Poisonous Dose.—A case is reported in "The Practitioner" when the patient took ʒj of citrate of caffeine for the corresponding effervescent preparation. In fifty minutes he complained of burning in the throat and giddiness, with vomiting and purging, and abdominal pain. The intellect was clear, though he was almost paralyzed and trembling; pulse 120, and patient in a state of collapse. Animal charcoal, nitrite of amyl, and ether finally produced vomiting, which was followed by the administration of one-minim doses of nitroglycerin with digitalis. At the end of nine hours he came out of the collapse and recovered in three days.—*Amer. Drug. Jour.*, 1884, 9.

Theobromine—Preparation and Characters.—To prepare this alkaloid, E. Schmidt and H. Pressler, mix cacao which has been freed from oil by pressure, with half its weight of calcium hydroxide, and boil repeatedly with 80 per cent. alcohol. After recrystallizing the residue obtained from the evaporation of the alcohol, the theobromine forms a white crystalline powder. It is anhydrous, and sublimes at about 290° without melting. Its salts are obtained by dissolving the base in concentrated acids, and resemble those of caffeine in their instability, being decomposed by contact with water or alcohol. The *hydrobromide*, $C_7H_8N_4O_2, HBr + H_2O$, forms colorless transparent platy crystals, which lose their water at 100° together with a part of the hydrobromic acid. The *hydrochloride*, $C_7H_8N_4O_2, HCl + H_2O$, crystallizes in colorless rosette-like groups of needles which lose both water and hydrochloric acid at 100°. The *platinochloride* $(C_7H_8N_4O_2)_2, H_2PtCl_6 + 4H_2O$, has been described by Glasson. According to the authors, it sometimes contains 4H₂O and sometimes 5H₂O. The *aurochloride* $C_7H_8N_4O_2, HAuCl_4$, forms yellow tufts of needles. The *sulphate* has been obtained in small colorless crystals, but of varying composition. The *nitrate*, $C_7H_8N_4O_2, HNO_3$, has been described by Glasson. The *acetate*, $C_7H_8N_4O_2, C_2H_4O_2$, forms a white voluminous precipitate, which gradually loses its acid by exposure to the air. In its behavior to methyl iodide, theobromine differs markedly from caffeine, for on heating the mixture either alone or in solution of alcohol or in chloroform, no combination of the theobromine with the methyl iodide takes place, whilst if a mixture of theobromine, alcoholic solution of potash, and methyl iodide in equivalent quantities, is heated at 100° in sealed tubes, caffeine is produced, identical with the natural bases: $C_7H_8N_4O_2 + KOH + MeI = C_7H_7MeN_4O_2 + KI + H_2O$. On heating the-

obromine with hydrochloric acid at 240–250°, it suffers decomposition similar to that of caffeine, yielding ammonia, methylamine, sarcosine, carbonic anhydride and formic acid. The same products are also formed on boiling theobromine with solution of barium hydroxide, and attempts to obtain an intermediate product, *theobromidine* (corresponding with caffeidine) have as yet been unsuccessful. The bromine-derivative, $C_7H_5BrN_3O_2$, obtained by the direct action of bromine, agrees with the compound described by Fischer. When theobromine is boiled with five parts of concentrated nitric acid in an upright retort until the greater part of the liquid has been volatilized, and the residue then evaporated on a water-bath, amalic acid is obtained. On boiling the latter with concentrated nitric acid a further decomposition takes place, with evolution of carbonic anhydride and formation of methyldiparabanic acid and methylamine. Maly and Hinteregger (1881), have shown that, besides these products, ammonia is also produced when the oxidation is effected by means of chromic mixture. Caffeine is decomposed by nitric acid in the same way as theobromine, dimethyldiparabanic acid, methylamine, and carbonic anhydride being formed, and in this case also no ammonia.—*Jour. Chem. Soc.*, Sept. 1883; *Annalen* 217. p. 287; *Amer. Jour. Phar.*, Jan. 1884, 44–45.

Piscidine.—Isolation from *Piscidia Erythrina*, which see under “*Materia Medica*,” p. 187.

Phaseoline—*An Alkaloid Obtained from Green Beans*.—Mr. Soltsien draws attention to the occurrence of an alkaloid in the legumes of the common bean (*Phaseolus vulgaris*). He had on a previous occasion observed the presence of an alkaloid in string beans, and, during a recent toxicological analysis, again traced the source of the alkaloid—which might, under circumstances, have been mistaken for a ptomaine—to the beans found in the stomach under examination. The new substance is not crystallizable in the free state, but does crystallize as hydrochloride. It gives the usual reaction for alkaloids.—*Arch. d. Phar.*, Jan. 1884, 29–30.

Cannabinum Tannicum—*Therapeutic Value*.—According to Dr. Eickholt, cannabinum tannicum (derived from Indian hemp), in doses of $\frac{1}{2}$ to 1 grain, he considers especially useful in neurasthenic insomnia and in mild melancholia without delusions, but not in excitable conditions. It does not derange digestion.—*Amer. Jour. Phar.*, Feb. 1884, 121, from *Deutsche Med. Woch.*, through *Med. and Surg. Rep.*, Jan. 19, 1884.

Abrotine—*A New Alkaloid*.—The common southern-wood (*Artemisia Abrotanum*) is reported by M. Craveri to yield a crystallizable alkaloid, which he has named “abrotine.” The sulphate, hydrochlorate, and citrate have been prepared, all of which crystallize well, and the hydrochlorate is very soluble in water. Some preliminary physiological experiments with abrotine have been made by Dr. P. Giacova, who finds it to

lower the temperature of the body, and to stop the action of a frog's heart in a few minutes. The alkaloid and its salts appear also to possess the property of preventing the putrefaction of albuminoid matter.—Pharm. Jour. and Trans., from L'Union Pharm., xxiv., 410; Amer. Drug., Feb. 1884, 32.

Picramnine.—A New Alkaloid from *Cascara Amarga*, which see under "Materia Medica," p. 190.

Ergotin and Ecbolein.—Physiological Action. See *Ergot*, under "Materia Medica," p. 121.

Boldina.—A new alkaloid from *Boldoa fragrans*, which see under "Materia Medica," p. 200.

Pilocarpine.—*Value as a Remedy for Fetid Foot-sweat*.—Dr. Armain-gaud has used a hypodermic injection of pilocarpine in several cases of fetid foot-sweat with good results. The suppression of sweating about the feet, even when rapidly brought about by the use of this remedy, does not appear to affect the general organism injuriously. Whether the effect is permanent cannot be decided at present. Pilocarpine acts here by exciting a diverting secretion in the salivary glands; the sudorific effect, which is more readily obtained with *jaborandi* than with pilocarpine, does not appear to be able to replace the specially salivating effects of the latter—New Rem., Aug. 1883,*243, from Pharm. Post.

Pilocarpine.—*Therapeutic Uses*.—Dr. James Murphy considers the use of pilocarpine, on account of its diuretic and diaphoretic properties, a valuable adjuvant in the treatment of puerperal eclampsia, as it reduces arterial tension at once, and gives our other remedies time to act. He reports two cases, in which it acted very favorably, in the "Amer. Jour. Obstetrics," Dec. 1883. He used it hypodermically in doses of $\frac{1}{3}$ of a grain.—Amer. Jour. Phar., Feb. 1884, 121, from Med. and Surg. Rep., Jan. 12, 1884.

Nicotine.—*Synthesis*.—Julius Hensel, of Zurich, announces in the "Pharm. Zeit." of Sept. 26, 1883, that he has accomplished the synthesis of nicotine in the following manner: Benzoic acid is dissolved in acetone, and mixed with concentrated sulphuric acid. On warming, the resulting precipitate is redissolved by the excess of acetone present. When cold the liquid is mixed with a solution of ammonia in absolute alcohol, which causes a separation of sulphate of ammonium, and yields a liquid containing the nicotine in solution, besides acetone and other products. On pouring the mixture now into not too large a quantity of water, the nicotine collects partly on the surface.—Amer. Drug., Feb. 1884, 24.

Chinoline.—*Reaction with Phenols*.—K. Hock observed a rather considerable rise of temperature to take place on mixing chinoline and *phenol*; the liquid remained transparent, but the author was unable to

obtain a well-defined definite compound. By combining with the aid of heat 2 molecules of chinoline with 1 mol. of resorcin a crystalline mass of *chinoline-resorcin*, $C_{24}H_{20}N_2O_2$, is obtained, which may be recrystallized, is readily soluble in alcohol, ether and chloroform, insoluble in benzin, sparingly soluble in cold water, and has a bitter, somewhat acrid taste. In a similar manner may *hydrochinone-chinoline* be obtained, which has similar properties, but, like hydrochinone, turns red when moist, on exposure to the air. Both compounds possess antiseptic and antipyretic qualities, and are being used in the hospital of Bern.—Amer. Jour. Pharm., Aug. 1883, 401, from Berichte, 1883, 885–887.

Chinoline—Compound with Chloral—On mixing the two liquids, O. Rhousopoulos obtained a white, insoluble, butyraceous mass, which could not be recrystallized. But on mixing the ethereal solutions of the two compounds only very little of this mass is formed, while the filtrate, on evaporation, will yield white crystals which melt at $66^{\circ} C.$, are decomposed by hot water, but may be recrystallized from benzol, and have the composition $C_{11}H_{11}NO_2Cl$, representing one molecule each of chloral, chinoline and water.—Amer. Jour. Phar., Aug. 1883, 401, from Berichte, 1883, p. 881.

Kairine—Therapeutic Value.—According to Dr. Riess, it would appear that practical medicine is not likely to be very greatly benefited by the new remedy. Dr. Riess found that one claim, at least, made for the drug was amply confirmed, namely, that its administration is unaccompanied by any disagreeable symptoms, such as headache, etc. But the effect of the doses is only brief, and hence it was necessary to administer a good many doses in the methodical treatment of typhoid fever or pneumonia—at least one grm. at a time, if the temperature was over $39^{\circ} C.$ ($102.2^{\circ} F.$), or $\frac{1}{2}$ grm. if it was over $38^{\circ} C.$ ($100.4^{\circ} F.$). It was necessary to exhibit the remedy almost hourly, so that the daily dose amounted to 8 to 11 grms., administered in 20 to 22 portions. Within six days one typhus patient received 50 grms., and another 110 grms. of kairine. In the latter case, Dr. Riess cautiously increased the dose to 2 grms. each time, which produced a remarkable fall of temperature to near $37^{\circ} C.$ ($96.8^{\circ} F.$), lasting from five to seven hours.

If further observation should demonstrate that kairine can be used for the systematic treatment of febrile diseases, it would certainly belong to the best antipyretics. But Dr. Riess does not consider it to be superior to quinine or salicylic acid. In cases of intermittent fever, kairine shortened the attacks a little, but did not prevent their recurrence.—New Rem., Sept. 1883, 267, from Pharm. Zeit., No. 57.

Sulphate of Paratoluidine.—A New Reagent for *Nitric Acid*, which see under "Inorganic Chemistry," p. 210.

Tropæolin, *Ethyl-orange*, and *Methyl-orange*.—Value as Indicators in Determining Free Acid in Presence of Salts. See under *Sulphuric Acid*.

Phenolphthalein.—Use as an Indicator in the Process of Estimating of Hydrocyanic Acid, which see under "Inorganic Chemistry," p. 224.

GLUCOSIDES AND NEUTRAL PRINCIPLES.

Saponin from Quillaya—Characters and Composition.—Mr. E. Stütz has prepared saponin from the bark of *Quillaia Saponaria*. It was obtained as a white, amorphous, neutral powder, generally possessing an astringent taste, due to traces of impurities; it is soluble in water, insoluble in absolute alcohol and ether; its aqueous solution forms a lather like soap. When heated to 195° it turns brown, and at a higher temperature evolves a vapor resembling caramel in odor.

The author was unable to obtain saponin free from inorganic impurities; and from the proportion of its barium compound it would appear probable that the impurities, principally consisting of calcium, were intimately associated with the saponin. From the mean of four concordant analyses the formula $C_{10}H_{20}O_{10}$ is deduced.—Amer. Jour. Phar., May 1884, 276-277; Jour. Chem. Soc., April 1884, 463, from Annalen, vol. 218.

Saponin from Saponaria—Characters and Composition.—The analyses hitherto made of saponin obtained from different plants are not very concordant, the results varying indeed from 47.52 per cent. C. and 7.16 H. (Overbeck) to 52.63 C. and 7.48 H. (Rochleder and Schwarz). Moreover the experiments of the last-named chemist lead to the conclusion that the carbohydrate obtained in the first instance from saponin by decomposition with acids, is not grape-sugar, but a body convertible into that sugar by the further action of acids—and consequently that saponin is not a glucoside but an amyloid. To throw further light on this matter, Mr. C. Schiaparelli has endeavored to determine whether the products extracted from different plants and included under the name of saponin, are really identical, and in the present paper he describes the results obtained with saponin from *Saponaria officinalis*.

The author, after describing the method of obtaining the pure saponin, states that it gave, as the mean result of five analyses, 52.65 per cent. carbon and 7.36 hydrogen, agreeing nearly with the formula $C_{22}H_{44}O_{11}$, which requires 52.86 C. and 7.44 H. Saponin from *Gypsophila* was found by Rochleder to contain 52.65 carbon and 7.34 hydrogen.

Pure saponin is a very white amorphous inodorous powder, which excites sneezing when inhaled by the nostrils; it has a pungent, disagreeable taste, and is poisonous; dissolves very freely in water, but is insoluble in ether, benzene, and chloroform, and only slightly soluble in alcohol. Heated on platinum foil, it decomposes, emitting an odor of burnt sugar, and leaving a porous residue difficult to burn. Saponin is lævogyrate, like most glucosides; specific rotatory power $[\alpha]_D = -7.30$: it is the least optically active of all known glucosides.—Amer. Jour. Phar., May

1884, 273-275; Gazette Chem. Ital., xiii, 422-431; Jour. Chem. Soc., March 1884, 332.

Saponin—*Presence of a Closely Allied Body in Camellia Oleifera, s. C. Drupifera*, Hooker, which see under "Materia Medica," p. 172.

Quassiin—*Preparation*.—After quoting the different methods of extraction proposed by other experimenters, Messrs. Adrian and Moreaux state that by the following process, which is their own, a purer and more abundant product is obtained than by any other.

Very sound wood reduced to thin shavings is exhausted by the aid of boiling distilled water, either by displacement or by decoction, carbonate of potash being added to the extent of 5 grams per kilogram of quassia. The liquor is then concentrated by evaporation, first by the open fire, afterwards in a water-bath, to the consistence of a soft extract; a mean of 60 grams per kilogram of quassia being obtained. The extract is afterwards suspended in hot 90° alcohol, and after standing a few moments the supernatant alcohol is decanted; the process being repeated a second and third time so as to thoroughly exhaust the extract. The alcoholic liquor is allowed to stand twenty-four hours, during which it deposits extractive matter and salts dissolved by the hot alcohol; the liquid should then be decanted, and sulphuric acid diluted with ten times its weight of 90° alcohol added until a precipitate is thrown down, from 2 to 2½ grams being necessary for each kilogram of quassia. The liquor is then filtered, milk of lime added in the proportion of 12 to 15 grams per kilogram of wood (or 4 to 5 grams of caustic lime), and after some hours' contact, it is passed through muslin and the deposit washed with alcohol and pressed, as it is very spongy and contains much alcoholic liquor.

The liquor being alkaline after the treatment with lime, it is neutralized by a current of carbonic acid, and then again filtered. Thus prepared the liquor has a light amber tint. It now remains only to distil the alcohol, and to dry the residue from the distillation. Each kilogram of quassia yields by this process about 8 grams of a friable and easily pulverized product, which is the amorphous quassiin of Adrian.

If, instead of amorphous, it be desired to obtain crystallized quassiin, the distillation should be stayed while there yet remains a small quantity of alcohol in the product, which is then poured boiling upon a moistened filter to separate the resin. This filter should be so placed that the liquor may be received in a porcelain capsule. The remainder of the alcohol is then evaporated by heating to 80°C., and as the alcohol volatilizes, the quassiin crystallizes out and is deposited. As soon as the liquor contains no more alcohol, it is withdrawn from the fire; when in a few minutes and before the liquor has quite cooled it forms a crystalline mass. When quite cold, the mother liquor is decanted and the crystals are washed several times with distilled water. The quassiin thus obtained is not quite pure; it still contains some resin and uncrystalliza-

ble quassiin. To purify it, it is dried, and then dissolved by heating it in twice its weight of 95° alcohol. It is then placed to crystallize in a funnel with a very short neck closed by a cork stopper; in cooling, the quassiin crystallizes, and after ten or twelve hours, forms a mass. The stopper is then removed and the alcohol, which has been used in crystallizing, is displaced by 90° or absolute alcohol, in order to wash the quassiin. As the crystallizing liquor draining away is replaced by fresh alcohol, the colored quassiin is seen to become white; a second crystallization suffices to render it very pure; the result is from $1\frac{1}{4}$ to $1\frac{1}{2}$ gram per kilogram of quassia.

The mother liquor and the wash waters of the first crystallization retain a considerable quantity of quassiin, which it is difficult to extract, but which may be obtained in a non-crystallizable form by repeated shaking with chloroform, and evaporation of the chloroform solution. It is nearly as bitter as the crystallized quassiin.

In brown quassiin, potassium salts predominate.

In yellow quassiin, calcium salts.

Crystallized quassiin is white, light, very soluble in chloroform, soluble in about 90 parts of cold absolute alcohol, in 35 to 40 of 80° alcohol, scarcely soluble in ether, and soluble in about 300 parts of hot water, from which it recrystallizes on cooling.

Uncrystallizable quassiin is very soluble in absolute alcohol, more soluble in ether than crystallized quassiin, and less soluble in water.—Amer. Jour. Phar., Feb. 1884, 98–100, through Phar. Jour. and Trans., Dec. 29, 1883, from Rép. de. Phar., June 1883, 246–250.

Quassin—Therapeutic Uses.—The active principles of *Quassia amara*, quassin, is obtainable both amorphous and crystallized. According to a writer in “Gazette des Hôpitaux” both forms produce the same effects; the former is preferable at a dose of 0.04 to 0.10 gm. a day; of the latter a dose above 0.02 gm. produces toxic effects. In a healthy man quassin produces during the first days a rapid increase of the appetite, a more complete digestion of aliments and a rapid development of strength. At a dose of 0.04 gm. before meals, it increases the alvine discharges, and therefore becomes useful in constipation caused by a feebleness of the muscular tunic of the intestines. This property is a precious one, for it permits, in many cases, to substitute the quassin for purgatives, which frequently render the constipation invincible, without speaking of the returns which most often are produced after their administration. At the same dose of 0.04 gm. before meals, quassin has been given to patients having three or four diarrhoeal discharges within twenty-four hours. After eight days of treatment the discharge became normal. Other experiments have proven that quassin has a most pronounced diuretic effect; that it increases the secretion of the salivary glands, of the fauces, of the kidneys, and also of the mammary glands. Quassin is

a bitter tonic, aperient, and stomachic. It must not be administered during the acute stages of diseases, but in the general debility, the atonic dyspepsia, the anorexia, the chlorosis, the spasmodic vomiting, the long and difficult convalescence, especially of fevers.—Amer. Jour. Phar., Sept. 1883, 472, from Chicago Med. Jour.

Cocculin—*A New Proximate Principle from Cocculus Indicus*.—Mr. Emil Löwenhardt, during the preparation of picrotoxin for experiments made in conjunction with Mr. E. Schmidt, obtained a small quantity of a compound which differed very materially in its behavior to reagents and solvents from the latter. The compound was separated from picrotoxin by repeated extraction with absolute alcohol, and recrystallization from hot water containing hydrochloric acid. The new compound, which the author proposes to name “cocculin,” forms fine, white needles, which are with difficulty soluble in hot water, and nearly insoluble in cold water, in alcohol, and in ether. Elementary analysis leads to the provisional formula $C_{19}H_{28}O_{10}$. Its behavior to solvents suggests its identity with the acid-like body, $C_9H_{12}O_6$, separated from fish berries by Barth, or with the “anamirtin” of Barth and Kretschy. Its distinction from picrotoxin is established by the failure of Langley’s nitric acid reaction.—Arch. d. Phar., March 1884, 184.

Loganin—*A New Glucoside from Strychnos Nux Vomica*.—Messrs. Wyndham R. Dunstan and F. W. Short have isolated from the pulp of the fruit of *Strychnos Nux vomica*, a new glucoside, for which they propose the name of “loganin.” It is present in the pulp to the amount of 4 or 5 per cent., and is contained in small quantity also in the seeds and pharmaceutical preparations made from them. The new substance was obtained by exhausting the pulp with a mixture of chloroform and alcohol (100 : 25). The exhaustion was effected in the apparatus for hot repercolation, devised and described by them in “Pharm. Jour. and Trans.” ((3), xiii. 633). The percolate, on cooling, deposited crystals, which when recrystallized a number of times from alcohol, and finally from absolute alcohol, were obtained pure, and were found to have a composition corresponding to the formula $C_{26}H_{44}O_{14}$. Loganin is easily soluble in water and alcohol, less soluble in ether, chloroform and benzene. Its aqueous solution is not precipitated by any of the alkaloid reagents. Its most characteristic reaction is found in its behavior with concentrated sulphuric acid. A very small quantity of loganin, when gently warmed with a few drops of concentrated sulphuric acid, yields a fine red color, which, on standing, develops into a deep purple. By boiling with dilute sulphuric acid, loganin is resolved into glucose (reducing Fehling’s solution), and a body which the authors propose to call

Loganetin.—This substance, like loganin, gives the characteristic reaction with sulphuric acid, but the purple color does not develop so

rapidly. Loganetin is soluble in water and alcohol, less soluble in ether and chloroform.

The authors observe, that while the formula for loganin, as given for the present, is the same as that given by Hlasiwetz and Habermann to the glucoside arbutin, it nevertheless is radically distinct from this. They promise to give the results of further investigation at an early date.—Phar. Jour. and Trans., June 21, 1884, 1025–1026.

Laserpitin—*Preparation, Characters, etc.*—Mr. R. Külz has made an investigation to determine the nature of the bitter principle *laserpitin*, which is contained in the root of *Laserpitium latifolium*, or white gentian root, and to discover the connection (if any) which obtains between this substance and the bitter principles contained in other umbelliferous plants.

Laserpitin.—The finely sliced root was extracted by boiling with light petroleum, and on evaporating the solution *laserpitin* was deposited in crystals belonging to the monoclinic system. These were purified by recrystallization from light petroleum, and were found to contain no water of crystallization. *Laserpitin* melts at 118° , is insoluble in dilute acids or alkalies, but is easily soluble in chloroform, ether, benzene and carbon bisulphide. Concentrated acids decompose it, sulphuric acid dissolving it with the production of a deep red color. This same color is observed when *laserpitin* is boiled with concentrated hydrochloric acid, or with alcoholic potash.

A series of combustions of the pure *laserpitin* gave numbers pointing to the formula $C_{18}H_{22}O_4$. No chloride or bromide of *laserpitin* could be obtained, but an acetate, $C_{18}H_{22}O_4 \cdot AcOH$, crystallized in silky needles from a solution in acetic acid; even this salt was unstable. Several derivatives of *laserpitin* were obtained. An attempt to produce an acetyl derivative by the direct action of acetic chloride or acetic anhydride gave negative results.

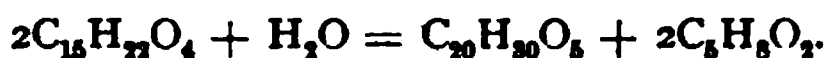
Monacetylaserpitin, $C_{18}H_{21}AcO_4$, may be obtained by the action of acetic anhydride on *laserpitin* in presence of anhydrous sodium acetate. It crystallizes in colorless needles, melting at 113° , and soluble in glacial acetic acid, alcohol, ether and chloroform, but insoluble in water.

Dinitrolaserpitin, $C_{18}H_{20}(NO_2)_2O_4 \cdot H_2O$, is obtained as an amorphous mass by the action of nitric acid on *laserpitin*. It melts at 115° , and is insoluble in water, but soluble in alcohol, ether, chloroform, and glacial acetic acid.

Bromolaserpitin, $C_{20}H_{30}Br_2O_8$, obtained by the action of bromine on a solution of *laserpitin* in chloroform, crystallizes in rosettes, which are soluble in ether, alcohol, chloroform, and glacial acetic acid; they melt at 90° .

Laserin, $C_{20}H_{30}O_8$, is a resinous substance (called by the author *lazerol*) which is produced when concentrated acids or alkalies act on *laserpitin*.

It is insoluble in acids, but is dissolved by ether, alcohol, chloroform, and glacial acetic acid. Its production, together with angelic acid, or methylcrotonic acid, by the action of sulphuric or hydrochloric acids on laserpitin, is symbolized by the equation :



Attempts to produce derivatives of this body were unsuccessful. From these results the author infers that laserpitin is chemically different from peucedanin, ostruthin and athamantin, bitter principles which have been found in other umbelliferous plants.—Amer. Jour. Phar., April 1884, 208-210; Jour. Chem. Soc., 1884.

Arbutin—Value as a Diuretic.—Dr. H. Menche, in "Centralblatt für. Klin. Med." finds that it acts in many cases as a valuable diuretic. Large doses may be taken without any ill effects. It passes in the urine partly in the form of hydrochinon, which is closely allied chemically to phenol. Urine containing hydrochinon becomes, by standing, of an olive-green color, just as happens in carboluria. Arbutin is of service in urethritis even of a specific nature. Brieger has employed a solution of hydrochinon as an injection in gonorrhœa, but the internal administration would seem to answer the same purpose. Arbutin is a glucoside, and occurs as fine white stable acicular crystals soluble in water, of neutral reaction, odorless, and of slightly bitter taste. The best mode of administration is in the form of powder dissolved in a tablespoonful of water. Patients do not complain of its taste.—Amer. Jour. Phar., Jan. 1884, 51, from Lousv. Med. News.

Phenoresorcin—Formatism.—This name is given by F. Reverdin to a liquid prepared by melting together 67 parts of phenol with 33 parts of resorcin and adding 10 parts of water. The mixture remains liquid and is soluble in water in all proportions.—Amer. Jour. Phar., Aug. 1883, 402, from Rundschau, May 10, 1883; La Ruche Phar.

Santonin—Manufacture in Turkestan—Mr. L. Knapp, writing from Tashkent, Turkestan, states that a santonin factory has been established at Tchimkant with a capacity to work up 10,000 kilograms of wormseed per 24 hours, which is likely to become a monopoly, since the difference between the cost of transporting the wormseed and the corresponding quantity of santonin is so great as to make it no longer remunerative to manufacture santonin in Europe or America. The factory is well appointed in every respect, and under the management of European experts.—Arch. d. Pharm., Aug. 1883, 598-599.

Santonin—Administration.—Dr. L. Lewin finds fault with all the usual methods of administering santonin. According to him, it should be given in its least soluble form, *i. e.*, in that form in which it will be the least readily absorbed, as the effect desired is not a general, but a local

one. An oily solution of santonin undergoes, according to his experiments performed on animals, not the slightest absorption in the stomach, so that under no circumstances is any trace found in the urine. Almost any kind of oil may be employed—cocoa-nut oil, olive oil, cod-liver oil, or castor oil. He recommends that three grains of santonin be mixed with two ounces of oil, and given in four doses. He thinks that a useful addition to the above would be that of an oil contained in santonica, the oleum cinæ æthereum, for the reason that all ethereal oils have been shown to act as poisons on the lower forms of animal life.—New Rem., Aug. 1883, 240, from Berl. Klin. Wochenschr.

Hop Bitter Acid—Preparation and Character.—Dr. H. Bungener has succeeded in isolating from hops a bitter substance, crystalline, insoluble in water, but soluble in alcohol and in alkaline solutions, and having in fact all the properties of Lermer's hop-bitter acid. The new substance is best obtained from fresh lupulin, from unsulphured hops, by the following process: The lupulin is first freed from gross impurities (hop seed, leaves, etc.), and then covered with petroleum ether—boiling at a low temperature (40° to 70°)—in stoppered flasks. The mixture is shaken up from time to time. After twenty-four hours, the dark-brown solution is drawn off by means of a Zulowsky filter immersed in the mass, and with the aid of a suction pump; then fresh ether is poured on the lupulin and it is allowed to stand another twenty-four hours, and the liquid drawn off as before. This process is repeated three times. The mixed solutions are evaporated at a low temperature, *in vacuo*, until a dark brown syrup remains, which on cooling solidifies to a crystalline mass. This is pulverized and freed from a dark, syrupy liquid by means of a suction filter; the highly colored crystalline cake is triturated with a small quantity of petroleum ether, again treated on the suction filter, and this operation is repeated three or four times until an almost colorless mass is obtained. This consists of hop-bitter acid, contaminated with a small quantity of a fatty substance. To remove this completely, the substance is dissolved in a little lukewarm alcohol, then cooled quickly, and the flakes of a fatty substance, which now separate, are removed by filtration with the aid of the suction pump. A few small crystals of the acid are then thrown into the filtrate, when, after a short time, crystallization commences. As soon as it appears to be ended, the mother liquor is removed by the aid of a suction filter, and the crystals are washed with a little cold alcohol. The mother liquor retains the greater part of the bitter acid, which must be quickly evaporated and consigned to a flask. The crystals obtained from alcohol may be obtained in beautiful prismatic crystals by melting them carefully in a flask and adding double the volume of petroleum ether.

The hop-bitter acid melts at 92° to 93° . It is easily soluble in alcohol, ether, benzol, chloroform, sulphide of carbon, and vinegar; to a

less extent in cold petroleum ether, and insoluble in water. It appears to undergo a change in solution, so as not to form crystals again, yielding instead a resinous mass. It is feebly acid, possessing the character of an aldehyde, and has a composition corresponding to the formula $C_{25}H_{38}O_4$.—Phar. Jour. and Trans., June 14, 1884, from Brewer's Guardian.

Cotoin and Paracotoin—Physiological Action.—Albertoni finds that repeated small doses of cotoin increase the appetite of healthy men without causing unpleasant sensations, and without producing constipation. It does not become dissolved in the gastric juice, but passes unchanged in the intestines, where it would appear to be absorbed, as it is excreted by the urine. The falling off in the amount of indican in the urine during the use is supposed to be due to a secondary effect, which depends on the cure of the internal lesion. The experiments made show that cotoin can determine an active dilatation of the vessels of the abdomen, an action not known to be possessed of any other substance. Paracotoin is weaker than cotoin in its physiological action. Albertoni considers that cotoin is of value in the diarrhoea met with in the various forms of mental disease, in chronic intestinal catarrh, in looseness of cachectic states, and in the relaxation of pellegra, phthisis and rickets. Its use is contraindicated in states of severe hyperæmia of the intestines, and where a tendency to melæna exists. Doses of 15 and 20 centigrammes per day were thought to be more effectual than smaller ones. The administration of bismuth with cotoin is suggested as likely to be of special value.—Amer. Drug., March 1884, 53, from Pharm. Jour.; Archiv für Exp. Path. und Pharm., Sept. 1883.

Jambosin.—A new crystalline principle from *Jambosa* root, which see under "Materia Medica," p. 180.

Heliotropin—Synthetical Preparation.—According to "Chem. Zeit." artificial heliotropin, or *piperonal*, is prepared in the following manner:

Piperin is first prepared by the usual method from pepper (preferably white pepper), and converted into piperate of potassium by boiling it for twenty-four hours with an equal part of potassa and 5 parts of ordinary alcohol. This is then dissolved in 40 to 50 parts of hot water, and the hot solution slowly mixed, under constant stirring, with a solution of 2 parts (that is, twice the weight of the piperate of sodium) of permanganate of potassium. The resulting magma is put on a strainer and repeatedly washed with hot water, until it no longer has the characteristic odor of heliotropin. The united liquids are now distilled, and from the first portions of the distillate, which are caught separately, the larger portion of the heliotropin or rather piperonal ($C_9H_8O_3$) separates, on cooling, in crystals; the remainder may be obtained by shaking the distillate with ether.—Amer. Drugg., May 1884, 94.

Ericolin.—Preparation from *Ledum palustre* and other *Ericacea*, which see under "Materia Medica," p. 146.

Globularin.—Description as obtained from *Globularia Alypum*, which see under "Materia Medica," p. 133.

COLORING MATTERS.

New Chromogens—Formation from Easily Oxidizable Constituents of Plants.—It is a well-known fact that the juices of many plants become discolored on exposure to the air. So, too, sections of stems and roots of leaves and fleshy fruits which acquire a brown color on exposure. Mr. J. Reinke remarks that little has been ascertained in regard to the physiology of these changes. They obviously depend upon the oxidation of certain constituents; this is seen, for instance on exposing grated potatoes to the air, when the uppermost layer assumes a brown color, which by frequent turning over of the mass may be communicated throughout. The same is seen in the case of the expressed juice of the potato. Putrefaction or fermentation, and reducing agents, such as sulphurous or hydrosulphuric acid, decolorize these fluids. The juice of the white sugar-beet is even more sensitive, becoming on exposure to the air immediately of a dirty wine-red color, then violet, brown and finally almost black. These facts indicate the presence in plants of easily oxidizable bodies; and inasmuch as the products of their oxidation do not occur within the uninjured cells, it follows that there is either no free oxygen in the latter, or that with these oxidizable substances other reducing substances are concomitant, hindering their oxidation, or again, that in the protoplasm oxidation affords other uncolored products. Upon which of these three factors the colorless state of the protoplasm and cell-juice of living plants depends, is not yet decided.

The author, in his endeavors to isolate the easily oxidizable constituents of the sugar-beet and potato to which the discoloration of their respective fluids is attributable, succeeded in the first instance in isolating from the beet-root a chromogen which on exposure to the air acquired a red color. This substance he has accordingly designated *Rhodogen*. The product of its oxidation he terms *beet-red*, and he notes certain remarkable analogies between the absorption-bands of this substance and of the coloring matter of *Anchusa tinctoria*, alkanet red, the spectrum of each showing three bands occupying identical positions. These investigations have therefore so far afforded proof of the existence in the colorless cells of the sugar-beet of an easily oxidizable colorless body, capable of isolation, which by itself, without the aid of the living plasma of the plant, can split up the oxygen molecule, forming a colored substance.

The isolation of the chromogen of the potato has not succeeded so satisfactorily. The presence of vanillin in the juice appeared to be shown by the strong odor of vanilla. Vanillin has been detected by Scheibler

in raw beet-sugar. A substance resembling catechol, but not identical with it, was also separated. It would seem to be the same body discovered by Gorup-Besanez in the leaves of *Ampelopsis hederacea*. It is undoubtedly an acid, and amongst the known aromatic acids most closely corresponds in its reactions with hydrocaffeic acid. In conclusion, the author suggests the hypothesis that these easily oxidizable bodies belong, in their physiological relations, to the retrogressive series, perhaps originating from the breaking up of albumin, or formed by the synthesis of the products of such decomposition, and that in these features they are allied to the process of respiration.—Amer. Jour. Phar., Jan. 1884, 51, from Jour. Chem. Soc., Sept. 1883; Zeitschr. Physiol. Chem., vi. 263.

Chlorophyll—Constitution.—Mr. Edward Schunck, who has for a long time been engaged in studying the nature of chlorophyll, is led to the conclusion that chlorophyll possibly belongs to the glucoside group of coloring matters. He refers to the failure, so far, to obtain unchanged chlorophyll in a pure state, but considers it possible to obtain unchanged chlorophyll in solution, free from any substance soluble in water. In order to effect this he proceeds as follows: Having extracted leaves of any kind with boiling alcohol, he allows the extract to stand for some time, filters off the deposit which usually forms, and then mixes it with its own volume of ether and with about two volumes of water, shaking up well. The liquid now separates into two layers, an upper green one, containing all the chlorophyll of the extract, and a lower bright yellow one, which contains tannin, a yellow coloring-matter, a substance giving the glucose reaction with Fehling's solution, and probably other substances besides. The two liquids are separated in the usual way, and the upper one is shaken up with fresh water, which now usually only shows a trace of color. This process of washing may be repeated, adding each time a little fresh ether, until the lower layer ceases to give the glucose reaction. The upper liquid leaves on spontaneous evaporation a bright green residue, which, though far from being pure chlorophyll, is free from everything soluble in water, and may therefore be employed to determine whether anything soluble in water, such as glucose, is formed by the action of acids on it. If some of the residue be treated with concentrated sulphuric acid in the cold, it dissolves, forming a green solution, which, after standing for some time, gives, on the addition of water, a dark-green precipitate. This precipitate consists essentially of two substances, the phyllocyanin and phylloxanthin of Frémy, which are undoubtedly products derived from chlorophyll, showing the absorption-bands of what is usually called "acid chlorophyll." The liquid filtered from this precipitate, when mixed with copper sulphate and an excess of caustic alkali, becomes blue, and the mixture, on boiling, deposits cuprous oxide. The experiment may be made in a slightly different manner. The residue left by the green ethereal solution of chlorophyll having been dissolved

in alcohol, sulphuric or hydrochloric acid is added to the solution, which is then boiled for some time, evaporated so far as to drive off most of the alcohol, filtered from the products insoluble in water, made alkaline, then mixed with Fehling's solution and boiled, when the usual glucose reaction takes place. In order to make sure that the reaction was not due to ready-formed glucose, he took in every case the precaution of testing a portion of the green chlorophyll residue with Fehling's solution before acting on the rest with acid. This was easily done by treating with weak alcohol, to which a little alcoholic potash and some Fehling's solution were added, and heating, when the whole dissolved easily, giving a green solution which, on boiling, in no case deposited the least trace of cuprous oxide, whereas, after adding an excess of hydrochloric acid to the liquid, boiling, filtering off the insoluble products, again making alkaline and boiling, the glucose reaction took place in a marked manner.

This experiment has never in any case failed, and it would follow, if uniformly successful, that the green leaves of all plants contain a glucoside insoluble in water, but soluble in alcohol and ether. That this glucoside is, in fact, chlorophyll, seems to the author highly probable. Nevertheless, absolute certainty cannot be attained, because the matter experimented on is a mixture, and it is possible that one plant out of many might give a decidedly negative result, which would upset the conclusion drawn from the rest.—*Amer. Jour. Phar.*, April 1884, 219–221; *Chem. News*, Jan. 4, 1884, 2.

Pure Chlorophyll—Preparation.—Dr. A. Tschirch observes that all attempts hitherto made to prepare pure chlorophyll must be regarded as failures. All attempts to obtain the coloring matter in the pure state from chlorophyll solution, either by precipitation with saline solutions, as formerly proposed by the author, or by separation with benzene, carbon sulphide, etc., fail in their object, inasmuch as the coloring matter is decomposed by the accompanying substances, even during the process of extracting it from the leaves.

Equally unavailing have been the attempts made to prepare the pure coloring matter by saponification of chlorophyll extracts. Chautard, (*"Compt. Rend.,"* [76], 570) has drawn attention to the differences between the spectroscopic characters of these alkaline solutions of chlorophyll and those of chlorophyll tincture. The author has himself also further studied the action of alkalies, and has found that this treatment always yields products of decomposition, recognizable as such by their spectroscopic characters.

According to the present state of our knowledge, we must regard as pure chlorophyll the product whose absorption spectrum agrees with that of living leaves, as regards both the positions of the individual bands and likewise their breadth and intensity. Such a body he has obtained

by a reduction of chlorophyllan, a substance easily obtained in the crystalline state, by the action of zinc dust on alcoholic solution of chlorophyllan at the heat of the water-bath.

Pure chlorophyll prepared as above forms blackish-green drops, which have not yet been made to crystallize. It dissolves with great facility in alcohol, ether and benzene, easily also in oils both fatty and volatile, sparingly in fused paraffin, not at all in water. It is converted by dilute acids into yellow chlorophyllan, by strong hydrochloric acid into blue phyllocyanin, and is resolved by potash lye into an emerald-green substance which dissolves readily in water, forming an emerald-green strongly fluorescent liquid, externally very much like chlorophyll solutions, and a yellow body which may be extracted by ether from the aqueous solution. The alcoholic solution of pure chlorophyll is much less sensitive to light than ordinary tincture of chlorophyll. The author regards this pure chlorophyll as identical with the chlorophyll of living plants, and reserves to himself the right of examining it further.

The author concludes his paper by a synonymy of certain bodies of the chlorophyll group.

Amer. Jour. Phar., April 1884, 216-219, from Jour. Chem. Soc., 1884, 57-62.

Chlorophyll—Uses for Imparting a Fresh Green Color to Oils and Fats.—In answer to a query, Mr. C. Schmidt states that a handsome green color may be imparted by heating the oil with about one-twentieth part of water and a sufficient amount of finely-cut green grass over a naked fire, under constant stirring, until the water is evaporated.

The same author states that the same effect may be produced in winter (when green grass is not available), by triturating enough of a mixture containing 10 parts of powdered turmeric and one part of indigo with the water before heating with the oil.

Another correspondent of the same journal states that Mr. Schütz, Apotheker in Vienna, has lately put on the market a "neutralized and dialyzed chlorophyll," in form of a thick extract, which may be used cold or hot. It is said to produce a very durable color, unaffected by ethereal oils or ammonia, and has the advantage that it makes the long-continued boiling of the vegetable matter unnecessary.—New Rem., July 1883, 197, from Pharm. Zeitg.

Litmus—Preparation of Solution.—To prepare a highly sensitive solution of litmus, Stutzer recommends the following method. Commercial litmus is dried, finely ground, and the coloring matter extracted with cold water. The united liquid extracts are filtered, evaporated to about one-fourth on a water-bath, then mixed with some clean, sifted sand, and finally with enough hydrochloric acid to render the liquid faintly acid, whereupon the whole is evaporated to dryness. The dry residue is repeatedly extracted with alcohol of 80-85%, until the latter scarcely takes

up anything more, and the remaining residue of litmus and sand is evaporated to dryness on the water-bath. For use, portions of this are extracted with hot water, to which a few drops of ammonia are added. The liquid is poured off from the sand and transferred to high glass cylinders, in which all the suspended particles will settle to the bottom within twenty-four hours. In this way, the exceedingly tedious filtration of a concentrated, turbid litmus solution is avoided. Portions of the clear solution (or the whole of it, according to circumstances) are then poured into cylindrical glasses (test-tubes, etc.), and carefully neutralized with diluted sulphuric acid, or with ammonia as the case may be, so that the liquid has still a distinctly blue color. The proper tint will be indicated by the fact that 3 or 4 drops of the liquid mixed with 25 cc. of distilled water will soon color the latter onion-red, in consequence of the carbonic acid held in solution by it. When requiring some of the litmus solution for titration, it is best to remove the requisite quantity by means of a small glass tube serving as a pipette.

If prepared in the described manner, the litmus solution is free from all impurities which interfere with its sensitiveness, and only contains the real blue coloring matter, the so-called azolitmine. The hydrochlorate of azolitmine is insoluble in water and alcohol, and may thus be separated from the other coloring matters.—*Amer. Drugg.*, April 1884, 66.

Coloring Matter of Grapes—Formation.—According to Mr. E. J. Maumené, the coloring matter of black grapes and red wine is produced by the oxidation and probably hydration of a colorless compound. When the berries just beginning to turn red are placed in a vacuum over sulphuric acid, the color changes to yellow; but on admitting moisture and oxygen, both are rapidly absorbed and the color changes to blue-black.—*Amer. Jour. Phar.*, July 1883, 369, from *Compt. Rend.*, xcv. 925.

Coloring Matter of Red Wines—Solubility.—See *Vitaceæ*, under “*Materia Medica*,” p. 174.

Violet Coloring Matter of Ergot.—See *Ergot*, under “*Materia Medica*,” p. 123.

Viola quercitrin.—A new coloring matter found in *Viola tricolor var arvensis*, which see under “*Materia Medica*,” p. 179.

Asebo-quercetin and Quercitrin.—Constituents of *Andromeda Japonica*, Thunb., which see under “*Materia Medica*,” p. 148.

Asebo-fuscin and Asebo-purpurin.—Constituents of *Andromeda japonica*, Thunb., which see under “*Materia Medica*,” p. 149.

ALBUMINOIDS.

Dialyzed Egg Albumen—New Process.—Mr. Heinrich Struve, in illustration of his new method of dialysis (which see under “*Pharmacy*”), communicates the following particulars with reference to the preparation of dialyzed egg-albumen:

It is well known that egg-albumen consists of large, tender, cell-like envelopes, containing a pale-yellowish albuminoid liquid of an alkaline reaction. In order to separate this liquid, the envelopes must be cut (with shears), the separated liquid diluted with water, strained, and pressed through linen, and afterwards filtered. But the filtration of such a liquid is a very tedious operation, and never yields a pure product, which is also acknowledged by Hoppe-Seyler, who states that the cellular membrane of egg-albumen has not yet been properly isolated.

If perfectly fresh egg-albumen—such as is obtained immediately after the breaking of the egg-shell and separation from the yolk—be subjected to dialysis in a bladder, with chloroform water as menstruum, the *albumen will be found to dialyse with remarkable rapidity*, until the last traces have passed through the membrane. It is only necessary to renew the chloroform water from time to time, and to test for the end of the process by taking a small volume of the dialysate and evaporating. If this leaves only a trace of a residue, the aqueous solution of which scarcely reacts with tannin, and which leaves only faint traces of ash, the process may be regarded as terminated.

The different diffusates or dialysates are perfectly clear, and have an alkaline reaction. When heated, and even when boiled, *no coagulation* takes place; but traces of hydrosulphuric acid are given off which may be detected by acetate of lead, and may be more amply developed by acetic acid. If the clear solution, however, be treated with acetic acid *before being boiled*, albumen will separate, but without the escape of hydrosulphuric acid, even on boiling.

All these diffusates may be evaporated on the water-bath without any coagulation or opalescence; and, if the concentrated liquid be finally completely dried in a rarefied atmosphere over sulphuric acid and chloride of calcium, the albumen is obtained in form of a glassy, faintly yellowish mass, which is completely soluble in water.—New Rem., July 1883, 203–204, from Jour. f. prakt. Chem., 1883, 231.

Albumen—New Test for its Detection in Urine.—Mr. Arthur R. Haslam, having observed that a solution of albumen containing chloride of sodium affords a precipitate with chloride of iron,* and, supposing the precipitate to be a compound of albumen and iron, proposes the reaction as a test for albumen in urine. The author has adopted the following method: A portion of the urine supposed to contain albumen is poured into a test-tube, and a few drops of a solution of chloride of sodium added and well mixed; then a solution of chloride of iron is carefully poured down the tube, forming a layer. If the appearance of a whitish cone be noticed, albumen is present. If phosphates are present in the urine, care must be taken to add (before using the test) sufficient acetic

* This reaction was noticed by the author of this report when engaged in the preparation of dry albuminate of iron. (See Proceedings 1880, 358.)

acid to make the urine acid.—New Rem., Aug. 1883, 239, from Chem. News, 1883, May 25th.

Albumins.—Decomposing Action of *Ergot*, which see under “*Materia Medica*,” p. 123.

Yeast—Preservation.—A writer in “*Pharm. Zeitschr. f. Russl.*” gives the following method for preserving yeast:

Fresh yeast is covered with water and thoroughly agitated or shaken with it. It is then allowed to deposit, the supernatant water poured off, and the residuary yeast mixed with enough sugar to prepare a thick syrup which must be kept in full and well-stopped bottles.—*Amer. Drugg.*, April 1884, 68.

Diastatic Ferment—Presence in Bacteria.—Recent investigations have conclusively established the universal occurrence of diastatic ferments in different parts of plants, and have thrown a new light on the processes of nutrition and fermentation.

According to earlier observations, the presence of diastase in the plant was limited to germinating wheat or barley, and knowledge in regard of its wider diffusion has been advanced by the recent works of Gorup-Besanez, Will, Kranch, and especially Baranetzky. The researches of Musculus, E. Schulze, O’Sullivan, and others, have afforded an insight into the quantitative relations and the modifying external factors of temperature and acidity concerned in the action of diastase in the transformation of starch into glucose.

Some experiments, made by J. Wortmann, in the summer of 1881 with milky juices, led him to believe that certain appearances of corrosion exhibited by the starch granules present must be due to the action of bacteria. The result of further precise experiments, undertaken to decide this point, led to the conclusion that bacteria are capable of drawing their supply of carbon from starch, and that the appearances of solution or corrosion exhibited by the solid starch granules are identical with those caused by the action of diastase or saliva. Continuing his experiments in different directions, the author obtained results which may be briefly recapitulated as follows:

1. Bacteria are capable of acting on starch, whether in the solid state, as paste, or in solution, in a manner analogous to diastase.

2. As in the case of diastase, different kinds of starch are attacked by bacteria with different degrees of rapidity.

3. The action of bacteria on starch is manifested only in the absence of other sources of carbon nutriment, and when access of air is not prevented.

4. The action of bacteria on starch is effected by a ferment secreted by them, and which, like diastase, is soluble in water, but precipitable by alcohol.

5. This ferment acts precisely as diastase in changing starch into a

sugar capable of reducing cupric oxide, but not possessed of peptonizing properties.

6. The ferment itself is also capable of acting on starch in the absence of oxygen.

7. The ferment is secreted by the bacteria also in neutral solution of starch, and exerts its influence under these conditions.

8. This influence is expedited in slightly acid solutions.

The author concludes his paper with speculations as to the conditions under which bacteria are capable of generating this amylolytic (diastatic) ferment, instead of the ordinary peptonizing one.—Amer. Jour. Phar., Dec. 1883, 623-626, from Jour. Chem. Soc., 1883, p. 390; Zeitschr. Physiol. Chem., vi. 287-329.

Crystal Pepsin—Process of Preparation.—Mr. C. L. Jensen gives the following specifications of his process, which produces what he calls "crystal pepsin:" Mucous membranes, or the whole stomachs, after being finely cut are introduced into a capacious stone jar or vessel and mixed with about one-fifth of water, acidulated enough to possess the sourness of vinegar. The mixture is then brought up from 100° to 130° Fahrenheit, and under constant agitation the stomachs are converted into a peptone of a syrupy consistency, which, after clarifying and purifying by any of the well-known methods, is spread on glass plates for drying in a room heated up to about 115° Fahrenheit. It is then scraped off, and the dry and brittle transparent flakes or scales are sifted through a sieve having about twenty linear threads to the inch, after which the product appears like minute crystals or scales.

"Any vegetable or mineral acid may be employed, sulphuric or muriatic acid being preferred, and the quantity employed depending upon the condition of the stomachs under treatment, the rule being that the digestion shall be as nearly as possible like the natural action of the stomach.

"The degree of heat may vary from blood-heat to about 130° Fahrenheit, and the operation will be facilitated by the addition of a small quantity of water, although this is not absolutely essential.

"The pepsin thus produced is transparent, readily soluble in water without the use of acid, is practically tasteless and odorless, free from inert additions, and is capable of being permanently preserved. It further possesses enormous digestive power—from one to seven hundred—owing to the fact that not only have all of the completed digestive ferments been extracted from the stomach, but the latent peptic principle has by the method of treatment been developed or rendered active in the same manner as it would naturally have been in the stomach of a living animal.

The above preparation consists of hard scales or crystals, transparent, odorless, tasteless, capable of being permanently preserved, freely solu-

ble in water without the use of acid, free from inert additions, and is claimed to have a digestive power of one to seven hundred.

For the above method he has received "letters-patent," and claims that no person can prepare it in a similar way without his permission and paying a royalty for the same.—Pharm. Rec., Nov. 1, 1883, 424.

Vegetable Rennet—Preparation.—See *Withania coagulans*, under "Solanaaceæ," p. 136.

Galazyme (Artificial Koumiss)—Preparation.—Mr. Adam Gibson, after referring to the difficulties encountered in the preparation of artificial koumiss—also called "galazyme"—from fresh cow's milk, with the addition of more or less cane sugar, observes that the plan which he has found most practicable is to use skimmed milk, starting the fermentation with a small proportion of cane sugar, and subsequently adding a large proportion of milk sugar. Skimmed milk may appear to be objectionable on account of its poorer quality, but the following analysis by Hartier of mare's milk compared with an average analysis of cow's milk shows that the latter contains more casein and fat, and less sugar than the former.

	<i>Mare's Milk.</i>	<i>Cow's Milk.</i>
Casein and nitrogenous substance . . .	1.4 per cent.	4.3 per cent.
Fat	2.1 " "	3.8 " "
Lactose	7.3 " "	4.5 " "

In using skimmed cow's milk we get rid of a quantity of fatty matter which tends, under certain circumstances, to favor butyric fermentation; by diluting with water we may reduce the proportion of casein, and by adding sugar we increase the saccharine constituent, then bringing the composition of the fluid to nearly that of mare's milk. The fatty constituent in the product is undoubtedly in less proportion than in koumiss; but it is believed by authorities that this is not an objectionable feature, while the product obtained by the following formula compares very favorably with the galazyme supplied to pharmacists generally.

Take of skimmed cow's milk, 150 ozs.; water, 50 ozs.; brewer's yeast, 1 oz.; cane sugar, 3 ozs.; milk sugar, 5 ozs. Dissolve the cane sugar in 20 ozs. of water, mix with 75 ozs. of the milk, and add the yeast; the mixture is now to be well stirred and set aside in a warm place (75° to 80° F.) for nearly six hours, or until small bubbles appear on the surface of the liquid; the remaining 75 ozs. of milk, along with 30 ozs. of water—in which the milk sugar has been dissolved—should now be added to the fermenting liquid, and the whole thoroughly mixed, strained, and bottled, the corks being securely tied down. It should then be kept at a temperature below 55° F., if not required for early use, or, if so required, it may be ripened in two or three days by keeping it at 70° F.

This method yields a preparation of a perfectly homogeneous consis-

tency, having a sweet and acidulous taste up to the fifteenth day, after which it acquires to a slight degree the taste of butter-milk, which flavor gradually increases as it grows older. It also begins to thicken after the fifteenth day, but even at the thirteenth day the casein remains finely divided after shaking. By methods which are detailed by the author, the constituents of the galazyme, obtained as above, have been determined at different stages, the results being shown in the following table, the last column of which gives Wanklyn's of full koumiss, 48 hours old, and prepared in London:

Constituents.	Galazyme.			Koumiss.
	Sp. gr. 1.0386 4th day.	Sp. gr. 1.0382 8th day.	Sp. gr. 1.038 12th day.	Sp. gr. 1.032 48 hours old. at 67°F.
Water.	88.66	88.52	88.36	87.32
Alcohol	0.60	0.80	1.00	1.00
Carbonic Acid	0.44	0.52	0.59	0.90
Total Solids	10.30	10.16	10.05	10.78
	100.00	100.00	100.00	100.00
Total Solids consisted of :				
Lactose	6.185	5.974	5.688	} 6.60
Lactic Acid.	0.225	0.360	0.540	
Casein	2.693	2.670	2.655	2.84
Fat	0.455	0.447	0.440	0.68
Ash.	0.552	0.534	0.521	0.66
Loss	0.190	0.175	0.206	
	10.300	10.160	10.050	10.78

A comparison shows that the variation is no greater than might be expected in working with different samples of milk.—Phar. Jour. and Trans., Jan. 26, 1884, 582-584.

Iron Koumys—Preparation.—Dr. Ebermann manufactures “Iron Koumys” as follows: To each bottle, 1 litre (33 ounces), he puts 5 to 10 grains ferrum lacticum, which dissolves very easily by shaking, and does not make the taste disagreeable. Anæmic patients use two or three bottles every day, and it is agreeable to the stomach. The effect is very good, and he recommends the use of “iron koumys in cases where iron powder or iron pills” cannot be used.—Amer. Jour. Phar., Aug. 1883, 403, from Berl. Med. Ztg.

Kephir—Nature and Uses.—Professor H. Struve, alluding to the recent researches of Mr. Ed. Kern (see Proceedings 1883, 303) on this Russian beverage, states that as the result of these researches kephir was not only introduced as medicine from the southern to the northern section of Russia, but that also a number of papers and pamphlets on this subject have been published. During the latter part of the past year

kephir has also been noticed in other countries, among others by Prof. Dr. F. Cahn, at the meeting held December 13, by the section for Natural Sciences of the Silesian Society at Breslau. Kephir has already become an article of speculation, is procurable in commerce, and will doubtless be further scientifically investigated. The narrow circle in which for centuries kephir has been harbored with almost religious piety has been broken, and it has become public property, notwithstanding the method of its preparation is still surrounded with a certain mystery, depending upon the so-called kephir grains, the new milk ferment of Kern. This can only be procured from the mountain tribes, but, after it has been obtained, kephir may be prepared, with the requisite precautions, at all times, in winter or in summer.

This present mystery concerning the origin and nature of the kephir-ferment invites further investigations, and it will doubtless not be a long time before the preparation of kephir in all its details will have been ranged with the known phenomena of fermentation in general. Then, most likely, this simple beverage and remedy of the mountain tribes of the high Caucasus will be accorded an important position among the domestic and general remedies, more particularly as towards koumis. But years of observation will be required to determine its true value; at present kephir is beginning to become a fashion remedy.

The author has undertaken the chemical investigation of kephir with the view of applying to it the results of his protracted investigations of milk, and of determining the changes produced by this ferment; although more difficult and complicated than expected, he hopes in the near future to be able to report his results.—*Amer. Jour. Phar.*, April 1884, 195-196, from *Ber. d. Deutsch. Chem. Ges.*, 1884, 314-316.

Gluten—Test.—A writer in "Chemical News" finds the following to give fairly correct results in estimating the quantity of gluten in flour. The principle on which the estimation is based is the production of a yellow nitro-body when nitric acid acts upon albuminoids; 0.5 of a gram of flour is weighed out and carefully transferred to a test tube, which is divided (beginning at the bottom and ending the graduation about half way up) into four parts of equal capacity; water is now to be added up to the fourth mark exactly, and the test tube violently shaken, being closed by the cushion of the thumb. Frothing is best avoided if the shaking be terminated by successive inversion of the tube; the contents are temporarily transferred to another dry test tube, while the marked one is cleaned (all the pourings into are to be done immediately after shaking). A quarter of the liquid is now poured back, viz., up to mark 1, and the tube filled up to mark 3 with nitric acid of strength such that half a test tube full of it appears white, when a white surface is observed vertically through it; but the acid should, barring this condition, be as strong as possible. The test tube is now to stand exactly five minutes,

with occasional shaking up, and is then to be filtered immediately after shaking through a dry receptacle; a standard flour is to be treated in the same way, and the two clear yellow solutions examined colorimetrically; the qualities of the flours are inversely as the heights of equal color.—Phar. Rec., March 1, 1884, 106.

Gelatin—Valuation.—Mr. F. Prolius has determined the amount of ash, water and insoluble matter (residue insoluble in hot water) in various kinds of gelatin (isinglass). To ascertain the gelatinizing property, 1 part of the sample was dissolved in 90 parts of water, filtered, and the degree of viscosity determined. To judge of the purity of isinglass, it is also recommended to subject the sample to microscopic examination.

Kinds of Gelatin.	Ash.	Water.	Insoluble.	Time re- quired for the solu- tion to run out.
	Per cent.	Per cent.	Per cent.	Seconds.
Astracan	0.20	16.0	2.8	507
do. from a collection	0.37	18.0	0.7	485
do. fine iridescent Russian quantity, from a collection	1.20	17.0	1.0	500
do. Russian	0.80	19.0	3.0	491
do. in laminæ	0.50	19.0	0.4	480
do. in threads, known as Hamburg Isinglass	0.40	17.0	1.3	477
Hamburg Isinglass	1.30	19.0	2.3	470
Another quality	0.13	19.0	5.2	—
Rolled northern fish bladder	3.20	1.5	10.8	467
Icelandish bladder	0.60	17.0	21.6	463
Indian isinglass	0.78	18.0	8.6	437
Yellow, quality unknown	2.30	17.0	15.6	360

Pharm. Jour. and Trans., May 10, 1884, 900, from Dingl. Polytech., I. ccxlix, 425.

URINARY AND BILIARY COMPOUNDS.

Urine—Expansion by Increase of Temperature.—In order that an observation of the specific gravity of urine shall be of any value, either the experiment must be made always at the same temperature, or else, the actual temperature being noted, an arbitrary correction must be applied. In clinical practice, the first alternative involves difficulties not easily surmounted, and most physicians would prefer to adopt the second. Unfortunately, however, their text-books are either silent altogether as regards the amount of the correction, or else the positive statements made by one authority contradict those of another. In view of these discrepancies, Dr. A. B. Lyons has experimentally tested the matter, and has embodied the results in tables, which will be found on pp. 89 and 90, Amer. Jour. Phar., Feb. 1884. A study of the author's figures shows that Neubauer and Vogel have given too large a correction, while Gold-

ing Bird has given one too small. As might be expected, different specimens of urine show different expansion, even when the density is about the same, and the variation is curiously capricious, sometimes being greater between 50° and 60° than between 60° and 70° F. On the whole, however, the expansion becomes more rapid as the temperature rises, so that a larger arbitrary correction should be made for temperatures above 77° F. than for those below that figure.

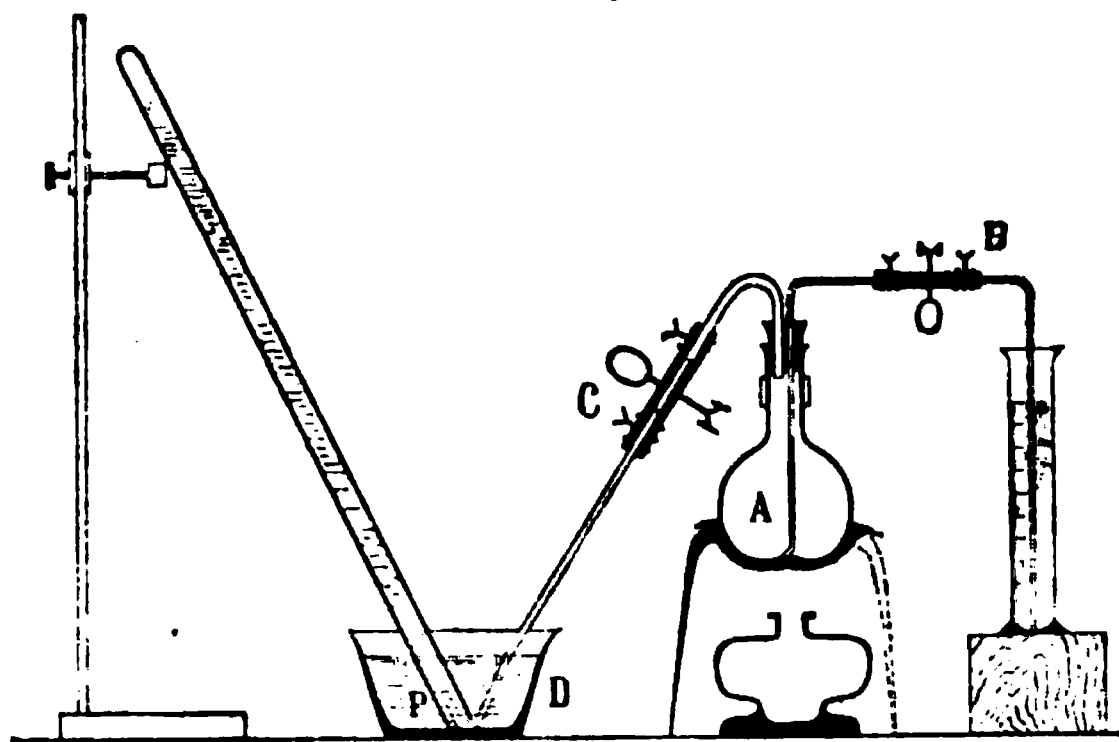
An average correction sufficiently exact for practical purposes would be for temperatures below 75° F. one degree of the scale of the urinometer ($= .001$) for $8\frac{1}{2}$ F., or nearly 5° C.; for temperatures above this, one degree of the urinometer for $7\frac{1}{4}^{\circ}$ F., or about 4° C.

Urine.—New Test for the Presence of *Albumen*, which see under “Albuminoids,” p. 337.

Urea—*New Apparatus for Assay.*—Prof. J. F. Eykman, some time ago, proposed a new method of estimating nitrous ether (see Proceedings 1882, 108) by means of a specially-arranged apparatus. It occurred to him that a modification of his apparatus for estimating nitrous ether would serve for making more exact assays than are possible by other methods.

The modified apparatus is illustrated in the accompanying cut (Fig. 56).

FIG. 56.



Eykman's apparatus for urea assay.

A is a flask holding about 200 cubic centimeters, which is closed by a doubly perforated rubber stopper, strongly secured by copper wire. The glass tube, *B*, has a calibre of only about two millimeters, and reaches nearly to the bottom of the flask, where its end is turned over at a right angle. The connections at *C* and *B* are made with stout pieces of rubber tubing fastened tightly with copper wire. The basin, *D*, is filled with mercury. The flask stands upon wire gauze placed on a tripod. The measuring tube or tubes are about 40 to 50 centimeters long, and are graduated to 50 cubic centimeters.

To prepare the apparatus for a series of assays, proceed as follows:

Warm the flask, *A*, while the pinch-cock at *B* is open, until a sufficient amount of air is expelled; then let cool and allow water to ascend in *B*. Close *B*, open the pinch-cock at *C*, and boil until all the air is expelled. Then place the orifice (*P*) of the gas-measuring tube (see further on) over the end of *C*; open *B* and close *C*. Now warm the flask until the liquid has been pushed back in *B*. Then remove the heat, and when no more vapor is produced and the liquid in *B* has again ascended to near the pinch-cock *B*, close the latter. It is now ready for use, and may be employed for a series of operations.

If urea is to be estimated, allow 50 cubic centimeters of alkaline bromine solution to ascend in the tube *B*, taking care that no air enter the apparatus. Next the solution containing the nitrogen to be estimated (say 10 cc. of a solution of urea containing about $\frac{1}{2}$ per cent., or one containing $\frac{1}{3}$ per cent. of ammonia, etc.) is allowed to enter in the same manner, and, finally, about 10 cc. of water, which serves to rinse the tube and brings the rinsings into the flask. Now close *B*, and warm the flask cautiously until the rubber tube above the clamp *C* begins to bulge out slightly. Then open *C* and receive the escaping gas in the measuring tube. Heat a little longer until no more nitrogen gas is given off, or until about 5 cc. of aqueous distillate has passed over into the tube. Then open *B*, close *C*, and allow the liquid to return through the tube (in the flask) into a beaker glass. Remove the lamp, and when the somewhat strong evolution of vapor has ceased and the liquid begins to reascend in *B*, close the stop-cock at *B* and proceed to make the next analysis.

Each operation consumes about ten minutes.

It will be seen, therefore, that once the apparatus is properly adjusted, it is ready for use at a moment's notice.

The measuring tube is prepared in the following manner: Its interior is first moistened, then about five cc. of mercury introduced, then about 0.2 or 0.3 gm. of pyrogalllic acid, and finally it is filled up with solution of soda. It is now closed with the finger, and inverted over the orifice *p* in the basin *D*. The upward curve of *p* should reach a distance of about two centimeters up into the tube. When the analysis is finished the tube is well closed with the finger, taken out of *D*, and shaken well for some time, to cause the absorption of the oxygen by the pyrogalllic acid. The tube is then placed, in a slanting position, in a vessel containing water, so that the mercury and the soda solution may be replaced by almost colorless water. It is then again taken out, while closed with the finger, turned up and down a few times, in order to wash down the soda solution still adhering to the upper walls of the tube, and finally immersed in a high cylinder containing a thermometer, and filled with water of about the same temperature as the reagents employed. When the gas has assumed the same temperature as the water, the tube is lifted up until

the level of the water inside and outside is alike, and the volume read off. At the same time, the temperature and barometric pressure of the air are noted.

Since the alkaline bromine solution, as well as the soda solution, contain a little air (and, therefore, nitrogen) in solution, the author determined the mean quantity contained in the volumes of these reagents directed to be used. He found this to amount to 0.5 cc. (nearly). Therefore, this value must be deducted from the amount of nitrogen finally left in the tube.—Amer. Drug., April 1884, 64.

Artificial Urea—Value as a Substitute for Quinine.—The “*Jour. d'Hygiène*” reports that Dr. Belvousoff, of Charkow, Russia, has used artificial urea (carbamide) as a remedy for intermittent fever in place of quinine. It is almost tasteless, and does not depress the nervous system. In Southern Russia, the peasants have used urine as a febrifuge for centuries; this has suggested the rational use of urea.—Amer. Jour. Phar., Feb. 1884, 121, from Med. and Surg. Rep., Jan. 12, 1884.

Hippuric Acid—The Acid of Gastric Juice.—According to Mr. Poulet (“*Jour. de Med. de Paris*”), the acid of gastric juice is neither lactic nor hydrochloric acid, but hippuric acid in the form of acid hippurate of potassium, combined with neutral phosphates of lime and sodium. He claims that microscopic examination of the crystals and experiments with dialysis demonstrate this conclusively.—New Eng. Med. Monthly, October; Amer. Jour. Phar., Dec. 1883, 597.

Hippurate of Soda—Mechanical Exhibition.—Mr. Peter Boa, in view of the probable general use of this salt in medicine, has made a number of experiments in regard to its behavior toward other substances with which it might be administered in combination:

(1) *Powders.*—The hippurate of soda itself, dispensed in powder form, keeps quite well in paper. Combinations of the salt with lithia carbonate and citrate, and bicarbonate of potash and soda, put up in powders in the usual way and kept for a fortnight, were found on examination to be in as good condition as when prepared.

(2) *Mixtures.*—Like all alkaline salts, the taste of hippurate of soda is disagreeably saline. The author has tried a number of combinations with the object of rendering its administration as pleasant as possible, and the results may be briefly stated.

Chloroform water or spirit of chloroform seems to make it more disagreeable, rendering it almost nauseous.

Infusion of calumba disguises the saline taste, and where the bitter is not an objection, affords an eligible vehicle.

The most agreeable mixtures, however, are obtained by employing syrup and peppermint water, or glycerin and cinnamon water.

The following examples may suffice:

- (1) \mathcal{R} . Sodæ hippurat. gr. 80.
 Lithiæ carb. gr. 24.
 Glycerin. \mathfrak{z} iv.
 Aq. cinnam. ad \mathfrak{z} viij.
 M. Sig.—One-eighth part for a dose.

- (2) \mathcal{R} . Sodæ hippur. \mathfrak{z} ij.
 Potass. citrat. \mathfrak{z} iij.
 Syrupi \mathfrak{z} vj.
 Aq. menth. pip. ad \mathfrak{z} vj.
 M. Sig.—Tablespoonful for a dose.

The addition of an alkaline carbonate or citrate as given in the foregoing is desirable, so as to imitate the condition of the renal excretion of the herbivora, which is alkaline, that of man being usually acid.

The salt is very soluble. Fifty grains dissolve in thirty minims of water, forming a syrupy liquid. The dose may be from ten to fifteen grains.—Amer. Jour. Phar., Feb. 1884, 108–110, Phar. Jour. and Trans., Dec. 29, 1883.

Choleate or Choleinate of Soda—Preparation.—Mr. Thos. S. Wiegand draws attention to this preparation called as above, but which is in reality

Purified Dried Ox-Gall.—It is recommended to be prepared by treating fresh ox-gall with twice its bulk of alcohol; the mixture is shaken frequently during twelve hours, the clear liquid is decanted, the alcohol distilled off, the remaining liquid filtered through well-washed animal charcoal and evaporated to dryness, or, when sufficiently concentrated, it is spread on glass plates exposed to a heat of about 140°F. till it scales. When thoroughly dry it should be preserved in well-stopped vials. It is given in doses of 5 to 10 grains, in the form of pills, as it is too unpleasant for any other form of exhibition. This method of desiccation is quite important, as the preparation becomes very tough if dried in mass.—Amer. Jour. Pharm., Jan. 1884, 8–9.

REPORTS OF COMMITTEES.

REPORT OF THE COMMITTEE ON THE DRUG MARKET.

BY M. N. KLINE, PHILADELPHIA.

A review of the Drug Market for the past twelve months shows the same settling of values which has characterized the business of the country generally; and a reference to the accompanying table will show that prices of many articles to-day are considerably lower than the average of some years past. This is notably the case with carb. ammonia, camphor, iodine and its salts, and quinine. The latter article has reached a lower price than it was ever known to sell for since its introduction, full reference to which will be made later on in this report under the proper heading. Notwithstanding this decline in prices, the trade, both wholesale and retail, is believed to be in a fairly sound condition financially, and very few failures have been reported during the year. Speculation seems to have almost entirely disappeared, and purchases have been mostly for actual wants.

A matter of congratulation, which, I find, has frequently been referred to in former reports, but which I cannot refrain from again mentioning, is the advance made by wholesale and retail dealers in drugs and chemicals in the matter of the quality of the goods handled. Competition appears to be in the direction of supplying the purest and best articles. That this is largely due to the influence of the "American Pharmaceutical Association" and the many state associations of pharmacists, no one will gainsay.

As I find that reference was made in a former report to the "Rebate Plan" as applied to patent medicines at wholesale, it may be of interest to note the introduction during the year under review of a plan to afford similar protection to retailers in the sale of this class of their stock. The advent of what are known as "Cutters" on patent medicines greatly disturbed the retail trade in some sections. As this class of preparations still forms a large percentage of the sales of most druggists, the urgent necessity to provide some remedy against making this part of the business unprofitable called into existence the N. R. D. A., under whose auspices the plan referred to has been inaugurated. It promises much in the direction of accomplishing the much needed relief.

We will review a few of the leading articles calling for comment. The ruling *package* prices for each month are arranged in a table furnished herewith.

TABULATED REPORT OF PACKAGE PRICES OF ARTICLES NOTED HERewith (Continued).

	1883.						1884.					
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March.	April.	May.	June.	July.
Manna	45	\$1 25	\$1 00	\$1 00	90	90	85	\$1 05	\$1 10	\$1 25	\$1 15	\$1 15
Morphine Sulphate.	\$3 25	3 25	3 25	3 25	\$3 25	\$3 40	\$3 40	3 40	3 40	3 40	3 20	3 40
Oil, Castor	17	17	17	18	18	18	18	18	18½	18½	18	18
" Cod Liver, Norweg., per bbl.	95 00	110 00	105 00	105 00	90 00	100 00	110 00	90 00	75 00	65 00	57 00	55 00
" " N. F., per gallon.	1 50	1 25	1 40	1 65	1 75	1 70	1 65	1 60	1 60	1 35	1 30	1 20
" Lemon	1 95	1 90	1 80	1 75	1 70	1 60	1 60	1 55	1 55	1 50	1 45	1 40
" Bergamot.	2 10	2 05	2 05	2 00	1 90	1 85	1 85	1 75	1 72½	1 70	1 70	1 70
" Olive, Malaga.	84	84	85	86	90	87	88	90	90	89	90	85
" Peppermint	2 75	2 65	2 60	2 60	2 60	2 60	2 65	2 65	2 65	2 75	3 00	3 25
Potass. Brom	29	28	27	27	27	27	30	29	28	28	28	28
" Iodide.	1 40	1 33	1 33	1 28	1 28	1 28	1 28	1 33	1 28	1 28	1 25	1 25
Quinine Sulph. Amer.	1 80	1 80	1 80	1 80	1 80	{ 1 60 } { 1 80 }	1 40	1 40	1 30	1 30	1 30	1 30
Root, Gentian.	10	8½	7	9½	9	8	7¼	7½	7	6½	6½	6
" Ginseng	2 00	2 00	2 20	2 10	2 00	2 10	2 10	2 10	2 10	2 10	2 00	2 00
" Ipecac	85	85	85	80	80	85	80	80	75	75	75	75
" Jalap	22	21	22	21	20	20	20	18	16	16	16	16
Seed, Cardamom	2 15	2 10	1 90	1 90	2 10	2 10	2 10	2 10	2 10	2 10	2 00	1 95
" Canary, Sicily.	4	4	3½	3¾	4	3¾	4	4	4	3¾	3¾	3¾
Hemp	3¾	3½	3¾	4	4	4¼	4¼	4	3¾	3¾	4	4
Rape.	5½	5¼	5¼	5¼	5	4¾	4¾	4¾	5	5	5½	5¼
Soap, Castile, Mottled, Pure.	7¼	7¼	7½	7½	7	6¾	6¾	6¾	6¾	6¾	6½	7
" " White, "Conti."	12	12	12½	13	12½	12	11¾	11¾	11½	12	12	11¾

A report of importations of drugs and chemicals at the port of Boston is furnished by E. Waldo Cutler, of that city, and appended to this report.

Alcohol, quoted in our table in Aug., 1883, at \$2.16, and remaining at about that figure, has, since May last, gradually declined, until now \$2.04 is the quantity price in eastern cities. Overproduction and an abandonment of all restrictions of sales through concert of action on the part of distillers, are the causes assigned for the decline.

Ammonia Carb.: A very marked decline has taken place during the year in this article, and the closing price is believed to net a very considerable loss to manufacturers. Until within a few years past, the bulk of this article sold here was of foreign production. Since it has become generally known that the American make is of very excellent quality, and reaches the consumer in a very much better condition than the imported, the foreign manufacturers have been obliged to fight for our market, and to this the present low quotations are doubtless very largely due. A prominent American manufacturer informed the writer recently that the present condition of the carb. ammonia business was simply a question of "who had the longest pocket."

Borax: Our report opens with quotations in lots at $12\frac{1}{2}$ and closes at $9\frac{1}{4}$. The addition of a duty of 30 per cent. on boracic acid in July '83 stimulated the California producers and brought additional ones into the field. This resulted in overstocking the market, and the great desire to realize has brought prices down to the present low rates.

Camphor: This article settled about 5 cents per pound during this year, and is now quoted at $17\frac{1}{2}$ by refiners. The high price for crude ruling a year ago stimulated a large over-production, with the usual result. The lowest prices ruled during the months when the demand was greatest.

Cantharides, opening at \$1.10, reached in January the very unusual figure of \$2.50 per pound, but at the close settled to \$1.30. A short supply "cornered," accounts for the extreme figures.

Cinchonidia Sulph., in sympathy with quinia, has gradually declined, and is quoted to-day at just half the price current a year ago. The demand for this salt has materially fallen off since quinine has reached the low price at which it is now offered.

Cubebs ranged from 75 cents to \$1.00 per pound during the latter part of 1883, but again fell off early in 1884, and at the close of our report are quoted at 70 cents. This, notwithstanding the prediction of a prominent holder and manipulator of this now precious berry, who in the fall of 1883 claimed that two dollars a pound would soon be the price.

Cream Tartar has changed but little in value during the year. The demand is almost exclusively supplied by the home manufacturers. A feature worthy of mention in this report is the fact that wholesale dealers

have now very rarely any call for the "commercial" or "grocer's" variety so largely sold some years ago. The druggists handle almost exclusively the pure only.

Glycerin has steadily declined since a year ago. The American manufacturers have been competitors in the German makers, who send large quantities into this country.

Guarana reached extreme prices during the time under review, as high as \$3.50 per pound being demanded by first hands during March, April and May of this year, while at the close it is again offered at \$2.00. This high price, according to Dr. Squibb, is reported to be due to this article, having become fashionable as a basis of drink probably fermented, among some half-civilized South American races.

Gum Arabic has continued to rule high, owing to small supplies reaching us in consequence of the Egyptian troubles. The highest point was reached in January, since which time it has gradually receded, and lower prices may be looked for in the near future.

Iodine and Salts have still further receded from the low figure of a year ago. The range is from \$2.10 at the opening to \$1.85 at the close of our report.

Manna has fluctuated violently during the year, jumping from 45 cents in August last to \$1.25 in September, and closing at \$1.15. Our quotation is for the grade known as "small flake."

Menthol, the camphor of Chinese or Japanese oil of peppermint, has attracted considerable attention latterly, which is due to the demand created for "Menthol pencils" recommended by the post of makers for headache, neuralgia, etc., and which have attained an enormous sale. The price has advanced from \$7.50 about a year ago to \$15.00, and the quantity imported from January, 1883, up to the present time, probably exceeds the whole amount brought in during the ten previous years.

Oil Castor has continued to rule high. The crop of beans in this country in 1883, was very much smaller than that of one year previous. The total production of Kansas, Missouri, and Illinois for 1883, was placed at 156,471 bushels against 499,799 bushels of the year previous. The estimate for the coming crop appears to be that it will be smaller than that of last year. Some of the oil sold during the year was made out of East Indian beans, while for the first time in a great many years some East Indian oil was sold notwithstanding the duty of \$1.00 per gallon.

Cod Liver Oil.—The extremely high figures for Norwegian cod liver oil prevailing during most of the year can best be explained by giving the following table of the production of this article in Norway during years named :

1877	13,150	barrels of 25 imperial gallons.
1878	9,560	" " "
1879	10,010	" " "
1880	13,715	" " "
1881	10,120	" " "
1882	4,100	" " "
1883	1,320	" " "
1884	10,690	" " "

Opium.

SMYRNA, 14TH JUNE, 1884.

TURKEY OPIUM.

<i>Crop for 1883-1884.</i>	<i>Cases.</i>
Arrivals from the interior to Smyrna	3767
" Constantinople	45
	<u>3812</u>
Arrivals in Constantinople	2013
Less shipments to Smyrna	45
	<u>1968</u>
Crop of Salonica	825
Less re-shipments to Constantinople	170
	<u>655</u>
Estimated stock remaining in the interior	355
	<u>6790</u>
Less re-shipments to Constantinople included in the arrivals there	190
Say crop of 1883-1884 (from about June 1, 1883, to May 1, 1884) Total. .	<u>6600 Cases.</u>

SMYRNA, JUNE 14TH, 1884.

Shipments for the year 1883-1884.

From Smyrna to America.	1340
" England	1092
" Holland	595
" France	112
" Austria and Germany	49
" Italy	23
" Spain	345
" Constantinople	190
" the East	223
	<u>3969</u>
From Constantinople to Europe	1852
" Salonica to Europe	655
	<u>6476</u>

Shipments for the year 1883-84, from about June 1, 1883, to May 31, 1884.

SMYRNA, JUNE 14TH, 1884.

Consumption of Turkey Opium for the year ending 15th June, 1884.

Arrivals in Smyrna since June, 1883	3812
Less re-shipments to Constantinople.	190
	<u>3622</u>

Arrivals in Constantinople since June, 1883	2013	
Less re-shipments to Smyrna	45	
	<u>1968</u>	
Crop in Salonica for 1883-84	825	
Less re-shipments to Constantinople.	170	655
	<u>6245</u>	
Stock in Smyrna June 1, 1883	1352	
" Constantinople June 1, 1883	150	
" London and afloat	2036	
" America	800	4338
	<u>10,583</u>	
<i>Deduct.</i>		
Actual stock in Smyrna	1248	
Less ready for shipment	100	
	<u>1148</u>	
Actual stock in Smyrna	120	
" London and afloat	2800	
" America	700	4768
	<u>5815</u>	
Consumption		6024
Against last year.		

OPIUM QUOTATIONS.

<i>London Trade.</i>						<i>Smyrna, Current Quality to Fine.</i>			
<i>Shillings and Pence.</i>									
1883.									
January	20.	13-	13-6	14-		120	to	130	Piastres.
February	17.	13-	13-6	14-		120	"	130	"
March	15.	12-	12-6	13-	13-6	120	"	130	"
April	14.	11-9	12-	12-6	13-6	110	"	120	"
April	28.	11-	11-6	12-		110	"	120	"
June	9.	10-6	11-6			100	"	105	"
July	7.	10-	11-			87	"	90	"
July	21.	9-6	10-	10-6	12-	90, 92, 95, 98			"
August	4.	12-	13-			100	to	110	"
August	18.	12-	13-			105			"
August	31.	12-	12-6			102	"	107	"
September	15.	11-6	to 12-			102	"	107	"
September	29.	11-	" 12-			100	"	108	"
October	13.	11-	" 11-6			100	"	105	"
October	27.	11-	" 11-6			100	"	106	"
November	10.	11-	" 11-6			95	"	106	"
November	23.	10-6	" 11-6			95	"	106	"
December	8.	11-	" 12-6			105	"	115	"
December	22.	11-6	" 12-6			110	"	120	"
Prices for good London trade opium in shillings and pence per pound.						Current to good in piastres per cheques.			
1884.									
January	19.	12-6	to 13-			115	to	125	Piastres.
February	2.	11-6	" 12-			110	"	115	"
February	16.	11-	" 11-6			105	"	115	"
March	1.	11-	" 11-6			105	"	115	"
March	15.	11-	" 11-6			105	"	115	"
March	29.	11-6	" 12-6			105	"	110	"
April	26.	11-6	" 12-6			102	"	104	"
May	10.	11-	" 12-			102	"	104	"
May	24.	10-6	" 11-6			100	"	103	"
June	7.	11-	" 12-			100	"	103	"
June	21.	11-	" 12-			100	"	103	"
July	5.	12-				110	"	112½	"

Prices for second quality not given, as they would only complicate figures and lead to confusion. Above quoted prices are only for *Prime Opium*.

PERSIAN OPIUM.

It now rules higher than *Turkey Opium*, but none comes here at present. Prices given as follows as a matter of interest :

Persian Opium: Good to Fine.

1883.			1884.		
January	20.	12 Shillings.	January	19.	16-
February	17.	12- to 12-6	February	2.	16-
March	15.	11-6 " 12-6	February	16.	16- to 16-6
April	14.	11-6 " 12-6	March	1.	16-6 " 17-
April	28.	11-6 " 12-	March	15.	16-9 " 17-
June	9.	12- " 13-	March	29.	17- " 17-6
July	7.	12- " 13-	April	26.	17-6
July	21.	13- " 14-	May	10.	17-6
August	4.	13- " 14-	May	24.	17-6
August	18.	13- " 14-	June	7.	17-6
August	31.	13- to 14-	June	21.	17-6
September	15.	13- " 14-	July	5.	17-6
September	29.	13- " 14-			
October	13.	12-6 " 14-			
October	27.	12-6 " 14-			
November	10.	12-6 " 14-			
November	23.	13- " 14-6			
December	8.	14-6 " 15-			
December	22.	15- " 15-6			

Latest Opium Cables to Date.

London, July 9th, "Buyers Smyrna Opium 120 Piastres."

London, July 25th, "Smyrna opium crop reported less than 5,000. Market strong. We are looking for the market to advance gradually."

Still later reports are to the effect that in the upper districts some more damage has been done by rains and hail during the incision of the poppy, and the yield will probably be less than 5,000, some putting it at 4,500.

Oils Lemon and Bergamot have both steadily declined, and, while our quotations are for standard brands, other good oils from shippers not so well known are offered considerably lower. Some lots of oil lemon, "without brand," and presumably without much reputation as to quality, have latterly been largely consigned to merchants in this country, and in some cases sold as low as 50 c. per pound.

Oil Peppermint has ruled at rather full prices, and at the close of our report shows a considerable advance; but whether this can be sustained appears to be doubted by some who should be in a position to know.

Potass. Brom. has fluctuated but little during the past twelve months, while *Iodide*, in sympathy with Iodine, has gradually declined.

Root Gentian opens at 10 c. and closes at 6 c., showing a gradual decline during this year. The price at same time in 1882 was 6 $\frac{1}{8}$ c., and in 1881 it was 4 $\frac{5}{8}$ c.

Ginseng has been in active demand, and commanded full figures, ruling at about \$2.00 per pound throughout the year.

Seeds, Canary, and Hemp and Rape, have changed but little in value. These seeds are now very largely sold by druggists, in packages.

Soap, Castile, both Mottled and White, shows but slight change. The quotation for white is for the "Conti" brand which now almost monopolizes the trade in this country.

Cinchona Barks and Sulphate of Quinia.

The quinine market has been in a very unsettled condition during the period we are reviewing.

Both manufacturers and dealers have been greatly embarrassed in their operations, for reasons which we shall proceed to explain.

Since the duty on foreign quinine was removed (July 1, 1879), the European manufacturers have sent over their product in steadily increasing quantities, while the American manufacturers have continued to make (although in a much smaller way than heretofore), and have struggled to retain a portion of the trade of this country; which, it is to be observed, is the only outlet they have for their article.

The following statistics, taken from the Reports on Commerce and Navigation, Bureau of Statistics (published by the U. S. Government), show the increase referred to in the importation of foreign sulphate of quinia.

For the fiscal years ended June 30th.

	Ounces.	
1877	75,804	} Duty 20 %.
1878	17,549	
1879	228,348	
1880	416,998	} Free.
1881	408,851	
1882	794,495	
1883	1,055,764	

For the fiscal year ending June 30, 1884, the imports of sulphate and salts of quinia and cinchonidia, amounted to 1,571,032 ounces, valued at \$1,774,853.

We ask careful consideration to the following statement, and regard it as worthy of the attention of the American people. During the fiscal year ending June 30, 1880, which was the first year of *free quinine*, there came into this country—of European quinine—416,998 ounces; and during the fiscal year ended June 30, 1884, of sulphate and salts of quinia and cinchonidia, 1,571,032 ounces.

Against this remarkable increase of imports we have to record the fact that not one ounce of American quinine was exported to Europe.

As you well know, there are but few makers of quinia in this country, as compared with those of Europe *combined*, while as numerous, perhaps, as those of any *one* country in Europe.

That they have sufficient experience, skill, energy, and capital, to make them formidable competitors in the markets of the world, under equally favorable conditions, *you* need hardly be told, who are so familiar with the firms engaged in the business.

How is it, then, that we see more than one million ounces of foreign quinine coming to this country in a single year, and not one ounce of American quinine going to Europe?

It is simply because it costs more to make quinine in the United States than it does in England, France, Germany, Holland or Italy. Cost of plant, charges for repairs, cost of crude materials, apparatus, taxes, wages, and general expenses of doing business, are much higher here than in Europe. Therefore, American manufacturers are so handicapped that the competition is, obviously, an unfair one, and, in the case of quinine, legislation was so adverse to our home producers, as to have practically crushed out the industry and handed it over to foreigners.

The contest being so unequal, it is a question how long it will be continued; and the future is so uncertain that it is idle to venture a conjecture. That prices should rule low cannot be a matter of surprise, when we consider the increased supplies of East India barks, and the enlarged capabilities of European manufacturers of quinine.

But competition has been pushed so relentlessly as to have resulted in prices unremunerative, and hence unsatisfactory, so that makers of quinine the world over are complaining.

As to our own country, on the one hand we have European manufacturers sending large consignments of their product to the United States, and, occasionally, selling it at rates lower than those current at the time in Europe. On the other, we have American manufacturers, some of whom have been established for many years, and who, naturally, have a pride in perpetuating their business, making a gallant fight for the home market.

It so happens that there is ability to prolong the unequal struggle. But that a disposition to sell at little or no profit, for an indefinite length of time, will be manifested for the sake of sentiment, is quite another matter; so that, as already stated, the future is very uncertain.

Business men, everywhere, work for something else than sentiment; and inasmuch as quinine makers in Europe, as well as in America, are dissatisfied with present results, an effort to combine and advance prices to a remunerative basis, and one more in harmony with the cost of bark, may be looked for at any time.

From the foregoing, it is not difficult to comprehend why the market is unsettled, and the future uncertain. So much for the manufacturers. Now, as to dealers. The wholesale druggists are obliged to sell quinine at a mere nominal profit, and, at certain seasons, they are forced to provide themselves with supplies, not only for immediate, but forward re-

quirements, and to contract ahead. To make contracts at fixed or absolute prices, under existing circumstances, is a questionable venture, alike to dealers and manufacturers.

Since writing the foregoing, the failure of “Fabrica Lombardi,” of Milan, the largest of the European quinine factories, followed by the news of the failure of C. G. Meier & Co., of London, the most extensive operators in cinchona bark, have still further demoralized the market. American makers reduced their quotations on August 14th, to \$1.10 in ozs., while foreign was freely offered in round lots in 100 oz. tins at 90 c. oz., which is about 22½ c. per oz. lower than any sale of foreign ever made in this country previous to this late panic.

A few statisticts in regard to barks may be appropriate in this connection.

As importations of foreign quinine have increased immensely of late, so have importations of bark diminished; and, as will be seen by the figures we will give, the year 1880 marked the decline of bark importations in the United States. Thus in 1880 the United States received 32,800 packages of cinchona barks, while Europe received 98,423. But in 1883, the United States received only 11,250 packages, and Europe 111,807.

We can hardly imagine that any one will fail to gather from these figures a clear understanding of the effects of making foreign quinine free of duty.

By the most abrupt and unusual methods of legislation, an American Congress wiped out an American industry; and one that physicians, wholesale and retail druggists, and, indeed, the American public professed to regard as of national importance.

Comparative importations of Cinchona Barks for the year ending December 31st.

<i>United States.</i>		<i>Europe.</i>	
1877	Packages 23,400	1877	Packages 35,147
1878	“ 41,000	1878	“ 55,770
1879	“ 46,700	1879	“ 74,660
1880	“ 32,800	1880	“ 98,423
1881	“ 31,400	1881	“ 141,812
1882	“ 28,000	1882	“ 157,228
1883	“ 11,250	1883	“ 111,807

Shipment of Bark from Ceylon to Europe for Seasons ending Oct. 1st.

1876-77	10,968 pounds for 1 year.
1877-78	19,428 “
1878-79	220,926 “
1879-80	882,997 “
1880-81	1,208,518 “
1881-82	3,099,895 “
1882-83	6,925,598 “
1883—Oct. 1st—to July 3, 1884 (10 months) . .	6,998,014 “

Shipments of South American Barks, Cuprea and other New Grenada Barks to London.

1879	30,659 packages.
1880	44,505 "
1881	87,232 "
1882	84,155 "
1883	49,827 "

STOCKS OF BARK.

July 1, 1883:	July 1, 1884.
London 88,475	London 79,568
Paris 10,000	Paris 11,000
New York 15,969	New York 2,600
114,444 bales.	93,168 bales.

The course pursued in this country in regard to a duty on foreign quinine is in striking contrast to that followed by other nations. We may briefly give *one* illustration :

The British Government legislated to give free solvents. Thus, in the year 1855, an act was passed to allow spirit of wine to be used duty free in the arts and manufactures of the United Kingdom. (Reference to this will be found in the U. S. Dispensatory.)

On the other hand, the United States Government, although frequently petitioned to do so, has made no such provision. Distilled spirits for drinking purposes and distilled spirits to be made into alcohol for use in the arts and manufactures, pay the same tax. The tax—equal to about \$1.70 per gallon on alcohol—is so high as to prohibit its use in making quinine ; and other solvents remain on the dutiable list.

The British Government fostered, at a large outlay, the cultivation of the cinchona plant in India, and the result is now seen in the immense supplies of cultivated barks furnished, and constantly offering in the London market.

The United States Government has done nothing whatever in this direction.

The British Government continued to impose a duty on quinine long after having pronounced for free trade, years subsequent to placing many kinds of manufactured goods on the free list, and some time following the date of the freeing of methylated spirits. Thus, by the tariff of Great Britain (1858–59) sulphate of quinine remained dutiable—16d. per ounce.

The House of Representatives of a United States Congress, without any reference to duties or taxes on apparatus, machinery, crude materials or solvents, and without professing to have lost faith in high duties on all other forms of foreign manufactures, suspended the rules of the House to place the single article—quinine—on the free list.

REPORT BY E. WALDG CUTLER, BOSTON, MASS.

“ From my own experience and observation, the drug business has relatively, of late, been as good, if not better, than most other branches of trade.

“ Notwithstanding the extraordinarily low value of drugs of late, the volume of trade has been increased over previous years. Furthermore, owing to the good standing, prudence, and foresight of the retailers generally, the losses from bad debts have been quite small, and with the help and mutual protection of the American Pharmaceutical Association, together with the valuable assistance resulting from the successful operation of the Campion Plan, their position (the retailers) must be largely still further strengthened and improved.

“ I enclose some statistical reports from our Custom House of the amount of drugs, etc., imported into this market, for your consideration, compiled for the year ending June 30, 1884.”

IMPORTATION OF DRUGS AND CHEMICALS AT THE PORT OF BOSTON, DURING THE FISCAL
YEAR ENDING JUNE 30, 1884.--REPORTED BY E. WALDO CUTLER, ESQ.
FREE.

REPORT ON THE DRUG MARKET.

361

	12		13		14		15		16		17		19		20.	
	Argols.		Bark Cinchona.		Cochineal.		Logwood.		Dyewood other.		Gum Arabic.		Cutch.		Shellac.	
	Lbs.	Val.	Lbs.	Val.	Lbs.	Val.	Tons.	Val.	Val.	Val.	Lbs.	Val.	Lbs.	Val.	Lbs.	Val.
1883.																
July . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	21,087	\$5,270	1,325	\$15,256	\$293	. . . . .	. . . . .	. . . . .	15,000	\$1,050	47,672	\$9,002
August . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	4,832	1,250	661	10,875	90	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	24,154	4,848
September . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	32,307	5,501	1,716	21,664	14,723	. . . . .	. . . . .	. . . . .	616,946	34,234	38,826	7,621
October . . . . .	. . . . .	. . . . .	. . . . .	. . . . .	22,577	4,291	624	6,740	2,712	. . . . .	. . . . .	. . . . .	1,457,935	79,856	18,589	4,165
November	2,132	\$501	. . . . .	. . . . .	. . . . .	. . . . .	2,064	28,152	1,175	. . . . .	. . . . .	. . . . .	224,672	9,995	. . . . .	. . . . .
December	23,821	1,833	. . . . .	. . . . .	. . . . .	. . . . .	3,053	38,171	3,160	43,935	\$7,712	. . . . .	991,027	63,371	. . . . .	. . . . .
1884.																
January	6,118	1,276	. . . . .	. . . . .	42,181	8,356	2,037	29,299	51	. . . . .	. . . . .	. . . . .	154,284	10,645	8,206	1,479
February	29,791	1,487	1,343	\$370	. . . . .	. . . . .	2,665	40,277	7,057	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	4,430	903
March	31,206	4,569	. . . . .	. . . . .	. . . . .	. . . . .	1,831	32,099	23,958	14,058	3,556	1,792,112	99,558	. . . . .	. . . . .	. . . . .
April	38,127	6,012	. . . . .	. . . . .	7,894	1,654	515	7,240	2,835	. . . . .	. . . . .	. . . . .	112,000	3,898	7,196	1,280
May	17,545	3,178	. . . . .	. . . . .	16,680	3,819	2,114	30,682	2,944	. . . . .	. . . . .	. . . . .	1,085,498	55,815	. . . . .	. . . . .
June	12,576	313	. . . . .	. . . . .	9,658	2,100	1,457	23,578	336	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .
	161,316	\$19,169	1,343	\$370	157,216	\$32,241	20,062	\$284,040	\$59,334	57,993	\$11,268	6,449,474	\$289,422	149,073	\$29,298	

REPORTS OF COMMITTEES.

FREE.—Continued.

	21		22		23		25		27		28		29		31	
	Gums, other.	Val.	Lbs.	Val.	Lime Chloride.	Val.	Gall.	Val.	Oz.	Val.	Soda Nitrate.	Val.	Brimstone.	Val.	Chemicals other.	Val.
	Lbs.				Lbs.						Lbs.		Tons.			
1883.																
July	44,244	\$11,505	. . . . .	. . . . .	2,284,462	\$26,825	13,750	\$2,312	. . . . .	. . . . .	4,200,408	\$76,650	. . . . .	. . . . .	\$18,539	
August	109	27	1,810	\$1,595	4,944,507	61,227	14,000	2,371	. . . . .	. . . . .	. . . . .	. . . . .	2,336	\$49,051	12,804	
September	643	270	1,178	764	4,823,101	70,282	10,160	2,323	. . . . .	. . . . .	1,907,957	31,977	. . . . .	. . . . .	18,164	
October	306	70	. . . . .	. . . . .	5,469,889	83,551	17,875	3,312	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	24,539	
November	9,168	964	6,096	4,549	3,223,618	57,222	1,856	1,158	. . . . .	. . . . .	2,309,639	39,590	50	1,114	27,226	
December	21,021	5,588	. . . . .	. . . . .	3,130,706	50,292	787	228	. . . . .	. . . . .	. . . . .	. . . . .	500	10,287	32,019	
1884.																
January	18,228	3,015	108,526	93,110	4,209,624	80,301	. . . . .	. . . . .	1	\$3	. . . . .	. . . . .	608	12,389	16,419	
February	20,458	3,002	153,512	171,331	5,329,954	110,660	. . . . .	. . . . .	. . . . .	. . . . .	3,012,562	50,935	. . . . .	. . . . .	9,190	
March	161,622	11,482	349,644	350,302	3,194,073	65,827	. . . . .	. . . . .	. . . . .	. . . . .	2,259,540	36,355	. . . . .	. . . . .	11,466	
April	13,236	3,197	207,646	159,508	2,407,194	44,629	3,500	1,923	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	20,035	
May	8,670	4,400	124,663	146,537	2,742,823	44,519	. . . . .	. . . . .	. . . . .	. . . . .	4,883,887	76,325	1,400	30,619	26,914	
June	3,794	1,466	. . . . .	. . . . .	2,198,617	35,798	21,863	6,032	. . . . .	. . . . .	. . . . .	. . . . .	400	8,692	15,524	
	301,499	\$44,986	953,075	\$927,696	43,959,448	\$731,113	83,791	\$19,659	1	\$3	18,573,993	\$311,832	5,294	\$112,152	\$232,839	

IMPORTATIONS OF DRUGS AND CHEMICALS AT THE PORT OF BOSTON DURING THE FISCAL
YEAR ENDING JUNE 30, 1884---REPORTED BY E WALDO CUTTER, ESQ.

DUTIABLE.

107	108	109	110	112	113	114	115	116	117	118
Coal Tar.	Glycerin.	Dyewood Ex-tracts.	Opium, Crude.	Potash, Nitrate.	Soda, Bicarb.	Soda, Carbonate.	Soda, Caustic.	Soda, other Salts.	Sumac.	Chem., other.
Val.	Lbs. Val.	Lbs. Val.	Lbs. Val.	Lbs. Val.	Lbs. Val.	Lbs. Val.	Lbs. Val.	Lbs. Val.	Lbs. Val.	Val.
1883.										
July . . .	\$7,421	\$12,004	. . .	. . .	\$1,161	4,720,164	\$32,753	20,000	\$272	\$23,067
August . .	10,713	3,493	. . .	. . .	28,851	3,597,548	694,214	32,827	355,600	16,197
September .	5,124	4,655	197	\$514	29,239	3,736,802	13,711	545	56,000	23,384
October. . .	8,420	1,398	. . .	. . .	48,170	44,232	795,078	258,345	. . .	18,751
November .	5,915	1,226	. . .	. . .	28,385	64,388	15,288	1,493	. . .	22,846
December. .	8,225	552	. . .	. . .	29,233	53,650	34,191	. . .	446,363	27,099
					34,120	48,435	27,749	. . .	1,737,706	
							19,722	. . .	899,664	
1884.										
January . .	4,125	1,019	. . .	. . .	. . .	3,691,029	25,719	. . .	1,555,040	29,051
February .	5,038	. . .	. . .	. . .	28,804	3,834,740	26,440	. . .	341,076	21,077
March . . .	1,116	. . .	. . .	. . .	29,208	4,227,652	35,361	. . .	186,880	17,460
April. . . .	3,237	1,025	. . .	204,228	30,998	4,507,922	27,252	2,240	224,000	24,986
May	2,503	2,193	. . .	. . .	33,986	3,350,780	14,603	25,992	357,257	18,140
June. . . .	2,178	1,181	. . .	. . .	24,721	4,593,723	22,311	. . .	8,046	14,896
								56,496	295	
	\$64,015	\$28,746	197	\$514	345,715	50,649,307	\$295,100	\$510,928	6,867,632	\$256,954

REPORT OF THE COMMITTEE ON LEGISLATION.

At the last meeting of the American Pharmaceutical Association the Committee on the President's Address reported that,

President Heinitsh recommends the passage by Congress of a National Pharmacy act to make a more uniform code of laws for all the States.

Resolved, That this important subject be referred to the Committee on Legislation for its consideration, with power to memorialize Congress if it sees fit.

President Heinitsh, in referring to such a suggestion made by others, had very cautiously coupled his remarks with the following:

"If such a law, not conflicting with the Constitution of the United States, could be enacted, it would be exceedingly desirable."

It might be presumed that the spirit, if not the letter of the Constitution of the United States, is familiar to every member; and that it was well known that Congress has not the constitutional power to interfere with or regulate in any manner the business or calling of the citizens of the different States, or to provide for or regulate in any manner the education of all or any portion of these citizens. The "Articles of Confederation and Perpetual Union" agreed upon November 15, 1777, and finally ratified July 9, 1778, contain the following:

ART. 2. Each State retains its sovereignty, freedom and independence, and every power, jurisdiction and right, which is not by this confederation expressly delegated to the United States in Congress assembled."

And the Tenth Article of Amendments to the Constitution declares that,

"The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the states respectively or to the people."

The powers of Congress are enumerated in Article I., Section 8, of the Constitution, which comprises 18 different clauses, not one of which has the slightest reference to the subject mentioned: which reference can certainly not be found in clause 1, which provides for the laying and collection of taxes, duties, imposts, and excises; nor in clause 3, which provides for the regulation of commerce (with foreign nations, and) among the several States. It is however undoubtedly contained in clauses 12, 13, and 14, which provide for the maintenance and government of armies and of a navy, so far only as the army and navy are concerned.

While it is evident from the foregoing that Congress has no power to regulate the practice of pharmacy in the different States, it has the power to regulate the status of pharmacy in the army and navy. With reference to this a resolution was passed at the last meeting on the recommendation of the Committee on the President's address, directing the Committee on Legislation to continue the efforts already made in this direction.

These efforts had their origin at the Niagara Falls' meeting in 1882, when a resolution was introduced and unanimously passed favoring the passage

of a law requiring the hospital stewards in the public service to be either graduates or licentiates in pharmacy, and conferring upon them the rank of commissioned officers. In speaking on this resolution, Dr. Menninger stated "that last winter a bill was introduced into Congress . . . it had the favorable report from the Naval Committee of the House of Representatives, but the bill was laid to sleep in the pigeon-holes of the Senate." The resolutions then passed were transmitted by your committee to Congress, and to the Hon. Secretaries and Surgeon Generals of the Army and Navy, as was reported last year. A copy of a bill was also procured, and is printed on page 320 of the last volume of the proceedings. Said bill was then supposed to have been previously presented to Congress; but when during the past winter the time came to memorialize Congress, correspondence with several Hospital Stewards of the Army and Navy revealed the fact that such a bill had never been before Congress, and that the parties interested supposed that the bill had been presented by a committee of this Association. It is well known that the session of Congress immediately preceding a Presidential election is not favorable for many legislative measures, and the last session was no exception to this rule. There being very little hope, that such a bill could be reported back from the proper committee in the regular order of business, it was deemed best not to memorialize Congress during that session, but to make an attempt of introducing it at an early date during the coming session. Your committee, therefore, respectfully suggest that the President of this Association appoint a special committee of three for the purpose of presenting to Congress the bill printed in last year's proceedings, or another covering the same ground. Your present committee on legislation desire to state that whatever aid they can give to this measure, will be cheerfully given.

Since the last meeting two State pharmacy laws have been enacted—one for the State of Ohio, and one for the State of New York, except the counties of New York, Kings and Erie.

The Ohio Board of Pharmacy consists of five pharmacists of at least ten years' experience, the appointment to be made from ten persons nominated by the Ohio State Pharmaceutical Association; one member of the Board retires each year. The Board is required to hold annually at least three meetings, one each at Cincinnati, Columbus, and Cleveland. Every proprietor or manager of a pharmacy at the time of the passage of the act is entitled to be registered as a pharmacist; and every clerk of at least three years' experience, and who is at least eighteen years of age, is registered as an assistant pharmacist; all others are to be examined before registration. The fee for the registration of pharmacists is \$3, and for assistants \$2, but those registered under the old (Cincinnati) law are exempt from this fee. The registration must be renewed every three years, at a cost of \$1 for proprietors and 50 cents for assistants.

The Secretary receives a fixed salary; the other members of the Board are paid \$3 per day and necessary expenses; the surplus of money received is held as a special fund. The fines are \$100 per week for unregistered proprietors, and \$50 for other offenders, this money to go to the school fund of the county.

The law does not apply to physicians supplying their own patients with medicine, nor to the sale of proprietary medicines, nor to country stores, as far as the sale of certain common chemicals and drugs is concerned, as well as certain pharmaceutical preparations, when compounded and put up by a registered pharmacist or wholesale druggist.

The bill appears to have been carefully drawn up, and its provisions are simple and clear; a copy of it is appended.

The Board of Pharmacy created by the New York law consists of five pharmacists, of whom one retires each year, and who are selected by the governor from ten nominees presented by the New York State Pharmaceutical Association. The Board must organize in Albany, and is required to hold at least one meeting every three months. Every proprietor at the time of the passage of the act, clerks of at least seven years' experience and twenty-one years of age, pharmacists registered by the Boards of New York City, Kings county or Erie county, all graduates of a College of Pharmacy in the State of New York, are entitled to registration as pharmacists; all others are required to submit to an examination. There is no provision in the law for registered assistants, the intention being, evidently, that only one class of pharmacists be licensed, who may be either proprietors, managers, or assistants; other assistants or apprentices are permitted to put up prescriptions or sell medicines only under the supervision of licensed pharmacists. The license is \$5, and the license may be revoked for just and sufficient cause. The Board is charged with the investigation of all violations of the law, and to report them to the proper prosecuting officers. Exempt from the provisions of the law are physicians supplying their own patients with medicines, dealers in patent medicines, and country dealers in domestic remedies put up by a licensed pharmacist or wholesale druggist. All violations of this law are regarded as misdemeanors.

A copy of the law is appended.

A few weeks previous to the passage of the last-mentioned law, a pharmacy law for Erie county was enacted, which in its general features resembles other pharmacy laws, but differs from the preceding in recognizing the diplomas not only of the Colleges of Pharmacy working under the laws of the State of New York, but likewise those issued by other legally instituted Colleges of Pharmacy. Medical diplomas are likewise recognized as sufficient evidence of proficiency in pharmacy.

A copy of the law is appended.

To complete the historical record of legislation on pharmacy within

the United States, the Committee beg leave to append also a copy of the pharmacy law for the City of Milwaukee, of the passage of which we had not been previously informed. It was approved March 10, 1876, and was in successful operation until superseded by the Wisconsin pharmacy law of 1882, which is reported in the Proceedings of that year, page 498.

OHIO PHARMACY LAW.

SECTION 1. *Be it enacted by the General Assembly of the State of Ohio*, That sections forty-four hundred and five, forty-four hundred and six, forty-four hundred and seven, forty-four hundred and eight, forty-four hundred and nine, forty-four hundred and ten, forty-four hundred and eleven, forty-four hundred and twelve, of the revised statutes of Ohio, be so amended as to read as follows:

Section 4405. It shall be unlawful for any person not a registered pharmacist to open or conduct any pharmacy or retail drug or chemical store, as proprietor thereof, unless he shall have in his employ and place in charge of such pharmacy or store a registered pharmacist within the meaning of this chapter, who shall have the supervision and management of that part of the business requiring pharmaceutical skill and knowledge; or to engage in the occupation of compounding or dispensing medicines on prescriptions of physicians, or of selling at retail for medicinal purposes any drugs, chemicals, poisons, or pharmaceutical preparations within this State, until he has complied with the provisions of this chapter; provided nothing in this section shall apply to, or in any manner interfere with, the business of any physician, or prevent him from supplying to his patients such articles as may seem to him proper, or with the making or vending of patent or proprietary medicines by any retail dealer, or with the selling by any country store of copperas, borax, blue vitriol, saltpetre, sulphur, brimstone, licorice, sage, juniper-berries, senna-leaves, castor-oil, sweet-oil, spirits of turpentine, glycerin, Glauber's salt, Epsom salt, cream of tartar, bicarbonate of sodium, and of paregoric, essence of peppermint, essence of cinnamon, essence of ginger, hive-syrup, syrup of ipecac, tincture of arnica, syrup of tolu, syrup of squills, spirits of camphor, number six, sweet spirit of nitre, compound cathartic pills, quinine pills, and other similar preparations, when compounded by a registered pharmacist and put up in bottles and boxes bearing the label of such pharmacist or wholesale druggist, with the name of the article and directions for its use on each bottle or box, or with the exclusive wholesale business of any dealer.

Section 4406. The Ohio State Pharmaceutical Association shall, immediately upon the passage of this act, submit to the governor the names of ten persons, residents of the State, who have had at least ten years' experience as pharmacists and druggists; and from the names so submitted to him, and others, the governor shall, with the approval of the senate, select and appoint five persons, who shall constitute a board, to be styled the Ohio Board of Pharmacy, and any member of the Board may be removed by the governor for good cause shown him; one member of said board shall be appointed and hold his office for one year, one for two years, one for three years, one for four years, and one for five years, and until his successor shall be appointed and qualified; and at its regular annual meeting in each and every year thereafter the said Ohio State Pharmaceutical Association shall select and submit to the governor the names of five persons with the qualifications hereinbefore mentioned, and the governor shall, with the approval of the senate, select and appoint from the names so submitted, or others, one member of said board, who shall hold his office for five years and until his successor shall be appointed and qualified. Any vacancy that may occur in said board shall be filled for the unexpired term by the governor, with the approval of the senate. Each member of said board shall, within ten days after his appointment, take and subscribe

an oath or affirmation before a competent officer to faithfully and impartially perform the duties of said office.

Section 4407. The Ohio Board of Pharmacy shall hold three regular meetings in each year—one at Cincinnati on the second Monday in January, one at Columbus on the second Monday in May, and one at Cleveland on the second Monday of October—and such additional meetings at such times and places as may be determined upon by said board, at each of which meetings it shall transact such business as is required of it by law; said board shall make such rules, by-laws, and regulations as may be necessary for the proper discharge of its duties, and shall make a report of its proceedings, including an itemized account of all moneys received and expended by said board, pursuant to this chapter, and a list of the names of all pharmacists duly registered under this act, to the Secretary of State, on the 15th day of November, 1884, and annually thereafter, and to the Ohio State Pharmaceutical Association. Said board shall keep a book of registration open at some place in Columbus, of which due notice shall be given in three or more newspapers of general circulation in this State, in which the name and place of business of every person duly qualified under this chapter to conduct or engage in the business mentioned and described in section forty-four hundred and five, shall be registered. Every person now conducting or engaged in such business in this State as proprietor or manager of the same, or who, being of the age of eighteen, has been employed or engaged for three years preceding the passage of this act as an assistant in any retail drug store in the United States, in the compounding or dispensing of medicines on the prescriptions of physicians, who shall furnish satisfactory evidence in writing and under oath of such facts within three months after the publication of said notice, shall be registered as a pharmacist or assistant pharmacist, as the case may be, without examination. Every person who shall hereafter desire to conduct or engage in such business in this State shall appear before said board, and be registered within ten days after receiving a certificate of competency and qualification from said board. The said board shall demand and receive for such registration from each and every person registered as a pharmacist a fee not exceeding three dollars, and from each and every person registered as an assistant pharmacist a fee not exceeding two dollars, to be applied to the payment of the expenses arising under the provisions of this chapter: provided, however, that no such fee shall be demanded of any person who has heretofore been registered as the proprietor or manager of such business or as an assistant therein, under the provision of any law heretofore in force in this State. Every registered pharmacist or assistant pharmacist who desires to continue the practice of his profession shall, triennially thereafter, during the time he shall continue in such practice, on such date as said board may determine, pay to the secretary of said board a registration fee, to be fixed by said board, but which shall in no case exceed, if a pharmacist, one dollar, if an assistant pharmacist, fifty cents, for which he shall receive a renewal of said registration. Every certificate of registration granted under this act shall be conspicuously exposed in the prescription department of the drug or chemical store to which it applies, or in which the assistant is engaged. The secretary of said board shall receive a salary which shall be fixed by said board; he shall also receive his travelling and other expenses incurred in the performance of his official duties. The other members of said board shall receive the sum of three dollars for each day actually engaged in the service thereof, and all legitimate and necessary expenses incurred in attending the meetings of said board; said salary per diem and expenses shall be paid after an itemized statement of the same has been rendered and approved by the board, from the fees and penalties received by said board under the provisions of this act. All moneys received in excess of said per diem allowance, and other expenses above provided for, shall be held by the secretary as a special fund for meeting the expenses of said board; he giving such bond as said board shall from time to time direct.

Section 4408. The Ohio Board of Pharmacy shall examine every person who desires

to carry on or engage in the business of a retail apothecary, or of retailing any drugs, medicines, chemicals, poisons, or pharmaceutical preparations, or of compounding and dispensing the preparations of physicians, as proprietor and manager, touching his competency and qualification for that purpose; and upon a majority of the Board being satisfied of such competency and qualification, they shall furnish such person a certificate of his competency and qualification as pharmacist, which certificate shall entitle the person named therein to conduct and carry on the business aforesaid, as proprietor and manager thereof, upon complying with the requirements of section forty-four hundred and seven. And such board shall also examine each person who desires to engage in such business as assistant pharmacist, touching his competency and qualification; and upon any such person passing a satisfactory examination, shall furnish a certificate setting forth that he is a qualified assistant in pharmacy, which certificate shall enable the person named therein to engage in said business as an assistant pharmacist upon his complying with the provisions of section forty-four hundred and seven.

Section 4409. The provisions of section forty-four hundred and eight shall not apply to any person engaged in the retail drug and apothecary business, as proprietor or manager of the same, at the time of the passage of this act, or who, being at the age of eighteen years, has been continuously employed or engaged for three years immediately preceding the passage of this act as assistant in any retail drug store in the United States, in the compounding or dispensing of medicines on the prescriptions of physicians, who has complied with the provisions of section forty-four hundred and seven.

Section 4410. No person not a qualified assistant shall be allowed by the proprietor or manager of any retail drug or chemical store to compound or dispense the prescriptions of physicians, except as an aid under the supervision of the proprietor or manager or his qualified assistant.

Section 4411. A qualified assistant, within the meaning of this chapter, shall be a clerk or assistant in a retail drug or chemical store who shall furnish to the Ohio Board of Pharmacy such evidence of his employment as is required by section forty-four hundred and seven, or a person holding the certificate of said board as an assistant pharmacist, as provided in section forty-four hundred and eight.

Section 4412. A person violating the provisions of section forty-four hundred and seven relating to registration, renewal of registration, or failing to conspicuously expose such certificate of registration, shall be deemed guilty of a misdemeanor; and, upon conviction thereof, be fined in any sum not exceeding one hundred dollars for each week he continues to carry on or to be engaged in such business without such registration; and for the violation of any of the provisions of section 4410, such pharmacist shall be deemed guilty of a misdemeanor; and, upon conviction thereof, shall be fined in any sum not exceeding fifty dollars for each and every offence; all fines assessed for the violation of any of the provisions of this act shall be placed in the county treasury, for the use and benefit of the common-school fund of the county in which such offence is committed. *Provided*, that nothing in this act shall be so construed as to in any way affect the right of any person to bring a civil action against any person referred to in this act, for any act or acts for which a civil action may now be brought.

SEC. 2. Original sections 4405, 4406, 4407, 4408, 4409, 4410, 4411, and 4412 of the Revised Statutes of Ohio are hereby repealed.

SEC. 3. This act shall take effect and be in force from and after its passage.

NEW YORK STATE PHARMACY LAW.

AN ACT TO ESTABLISH A BOARD OF PHARMACY AND TO REGULATE THE PRACTICE OF PHARMACY FOR ALL THE COUNTIES OF THIS STATE EXCEPT NEW YORK, ERIE AND KINGS.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

SECTION 1. There shall be established and created a Board of Pharmacy as follows:

1. Within ninety days after the passage of this act the New York State Pharmaceutical Association shall nominate ten pharmacists, residents of the district to which this act applies, from which number the Governor of the State shall, within twenty days after notice to him of such nomination, appoint five, who shall constitute the Board of Pharmacy.

2. It shall be the duty of each member of the Board of Pharmacy, immediately after the receipt of the notice of his appointment, to appear before the clerk of the county in which he resides, and make and subscribe an oath to properly and faithfully discharge the duties of a member of the said Board of Pharmacy.

3. One of said members shall hold office for one year, one for two years, one for three years, one for four years, and one for five years, from the first Tuesday of September, in the year one thousand eight hundred and eighty-four, which term shall be determined by lot at the first meeting of said Board of Pharmacy.

4. The said members of said Board shall meet on the first Tuesday of September, in the year one thousand eight hundred and eighty-four, at the College of Pharmacy building in the city of Albany, at twelve o'clock, noon, of that day, and shall immediately proceed to organize by determining by lot the respective terms for which they shall hold office, and by electing a president, treasurer, and secretary, who shall hold their respective offices for the term of one year.

5. The board shall hold meetings at least once in three months. Three members shall constitute a quorum.

6. The said board shall have power to make such by-laws, not inconsistent with the constitution, or the provisions of this act, as it may deem necessary.

SEC 2. It shall be the duty of the Board of Pharmacy—

1. To examine all persons applying for licenses under this act, and to grant licenses to such persons as may be entitled to the same.

2. To keep a record of licensed pharmacists.

3. To investigate all complaints of disregard, non-compliance, or violation of the provisions of this act, and to bring all cases of violation to the notice of the proper prosecuting officers.

SEC. 3. Any person who at the time of the passage of this act is carrying on the business of retailing or dispensing drugs, medicines, or poisons, or practicing pharmacy on his own account, or who, at the time of the passage of this act, shall have served seven years or upwards at the business of retailing or dispensing drugs, medicines, or poisons, or practicing pharmacy, and who is over the age of twenty-one years, or any person who holds a certificate of registration as a pharmacist from any Board of Pharmacy legally created under the laws of this State, or any person who holds a diploma as a graduate of any incorporated college of pharmacy of this State, shall be granted a license by said Board of Pharmacy to practise as a pharmacist upon compliance with the requirements hereinafter stated.

SEC. 4. Any person entitled to a license as a pharmacist, as provided for in section three, who shall not, within ninety days after the organization of the Board of Pharmacy, as herein provided, make a written application to such Board for such license, accompanied by a written statement signed by him or her and duly verified before an officer

authorized to administer oaths within this State, fully setting forth the grounds upon which he or she claims such license, shall be deemed to have waived his or her right to a license under the provisions of said section.

SEC. 5. No license shall be granted to any person under the provisions of section three of this act unless the applicant pays to said Board of Pharmacy the sum of five dollars.

SEC. 6. The said Board of Pharmacy shall make such regulations for the examination of applicants for licenses, and the granting of licenses to such applicants, and the payment of license fees as it may deem proper, but no license fee shall exceed the sum of five dollars.

SEC. 7. The New York State Pharmaceutical Association shall, annually, after the first Monday in June, in the year eighteen hundred and eighty-four, nominate ten pharmacists, residents of the district to which the act applies, from which number the Governor shall fill the vacancy annually occurring in the board, and the person so appointed by the Governor shall hold office for five years. In case of the death, resignation, or removal from the State of any member of the board before the expiration of his term of office, or in case of vacancy occurring from any other cause but expiration of term of office, the Governor shall fill the vacancy from the list of names nominated as aforesaid during the year in which such vacancy occurs, and the person appointed shall hold for the unexpired term of his predecessor.

SEC. 8. Every person to whom a license is granted by said Board of Pharmacy shall display the same in a conspicuous part of the pharmacy in which he or she does business.

SEC. 9. No license granted by said Board of Pharmacy shall be revoked except for just and sufficient cause.

SEC. 10. It shall be unlawful, after the first day of January, in the year one thousand eight hundred and eighty-five, for any person to practice as a pharmacist unless he or she shall have been granted a license by said board.

SEC. 11. Nothing in this act shall be so construed as to apply to the business of a practitioner of medicine, nor to prevent practitioners of medicine from supplying their patients with such articles as they may deem proper; nor to those who sell medicines and poisons at wholesale; nor to the manufacture or sale of patent or proprietary medicines; nor to the sale of the usual domestic remedies by retail dealers, put up by and bearing the label of a licensed pharmacist or druggist, in the rural districts. And nothing in this act shall be so construed as to prohibit the employment in any pharmacy of apprentices or assistants, for the purpose of being instructed in the practice of pharmacy; but such apprentices or assistants shall not be permitted to prepare and dispense physicians' prescriptions, or to sell or furnish medicines or poisons, except in the presence of and under the personal supervision of a licensed pharmacist.

SEC. 12. All violations of the provisions of this act shall be deemed misdemeanors and shall be punished as such.

SEC. 13. This act shall not apply to the counties of New York, Erie and Kings.

SEC. 14. All acts or parts of acts inconsistent with the provisions of this act are hereby repealed.

SEC. 15. This act shall take effect immediately.

III. ERIE COUNTY, N. Y., PHARMACY LAW.

LAWS OF NEW YORK.—CHAPTER 207.

AN ACT TO REGULATE THE PRACTICE OF PHARMACY, THE LICENSING OF PERSONS TO CARRY ON SUCH PRACTICE, AND THE SALE OF POISONS IN THE COUNTY OF ERIE, PASSED APRIL 25, 1884.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

SECTION I. 1. From and after the passage of this act it shall be unlawful for any person to open or carry on, within the county of Erie, any pharmacy or store for the purpose of retailing, compounding or dispensing drugs, medicines or poisons, unless such person shall be or shall employ and place in charge of said pharmacy or store, a registered pharmacist within the meaning of this act, except as hereinafter provided.

2. And it shall be unlawful for any person to be employed for the purpose of compounding or dispensing drugs or medicines, or retailing poisons, within said county, by the proprietor of a pharmacy or store, unless such person shall hold a license as a pharmacist, or assistant pharmacist, obtained as hereinafter provided.

SEC. 2. Any person, upon application to the Board of Pharmacy, as hereinafter provided, shall be granted a license by such board as a pharmacist, on compliance with the requirement hereinafter stated as follows :

1. If such person, at the time of the passage of this act, shall be carrying on the business of retailing or dispensing drugs, medicines or poisons, or practicing pharmacy on his own account, within said county of Erie.

2. Or if such person has had at least four years' practical experience where physicians' prescriptions are dispensed, and has obtained a diploma from some legally-constituted college of pharmacy, or college of medicine, or foreign institution of equal rank and requirements.

3. Or if such person holds a certificate of registration as a pharmacist of corresponding grade, from any Board of Pharmacy legally created under the laws of this State prior to this act.

4. Or if such person has had at least four years' practical experience where physicians' prescriptions are dispensed, and shall pass a satisfactory examination for the grade of pharmacist before said Board of Pharmacy.

SEC. 3. Any person, upon application to the Board of Pharmacy, as hereinafter provided, may be granted a license by such board as an assistant pharmacist, on compliance with the requirements hereinafter stated, as follows :

1. If such person hold a certificate of registration as an assistant pharmacist, of corresponding grade, from any Board of Pharmacy legally created under the laws of this State.

2. Or, if such person is actually engaged, at the time of the passage of this act, in the business of dispensing medicines and poisons, and shall have had at least two years' practical experience in compounding medicines and dispensing physicians' prescriptions.

3. Or, if such person has had at least three years' practical experience where physicians' prescriptions are dispensed, and shall pass satisfactory examination for the grade of assistant pharmacist before said Board of Pharmacy.

SEC. 4. Any person entitled to a license as a pharmacist, either under subdivision first, second, or third of section two of this act, shall, after the organization of a Board of Pharmacy, as hereinafter provided, make a written application to such board for such license, accompanied by a written statement signed by him and duly verified before an officer authorized to administer oaths within this State, fully setting forth the grounds entitling him to such license. Said applicant shall exhibit to said Board of Pharmacy, if

required by them so to do, any college diploma, or certificate of examination or registration upon which he shall claim a license. Said board, on receipt of such application and verified statement, shall examine the same, and if such board are satisfied that the applicant is entitled to a license under either of said subdivisions first, second or third of section two, it shall grant him such license to practice as a pharmacist within the said county of Erie. Such license shall not be granted unless the application therefor is accompanied by the sum of five dollars. Any person entitled to a license under either of said subdivisions first, second or third of section two of this act, who shall be notified by said Board of Pharmacy that it is duly organized for the granting of licenses under this act, and shall not, within ninety days after such notification, make the application required by this section, shall thereby forfeit his right to such license until he shall pass an examination satisfactory to said board.

SEC. 5. Any person not entitled to a license as a pharmacist under subdivisions first, second, or third of section two of this act, and desiring to practice pharmacy within Erie county, shall make a written application to the Board of Pharmacy, hereinafter provided for, for an examination and a license; such application shall be accompanied by a written statement, signed by the applicant and verified before an officer authorized to administer oaths within this State, setting forth the necessary facts required by subdivision four of section two, to entitle him to such license. Such application shall also be accompanied, by the sum of seven dollars, upon the receipt of which said board shall, if in session, and if not, at the next meeting thereof, examine such applicant, and if such board are satisfied that he has the requisite knowledge and experience, it shall grant him a license to practice as a pharmacist within the said county of Erie.

SEC. 6. Any person carrying on any pharmacy or store within said county of Erie, either as principal or agent, for the purpose described in subdivision first of section one of this act, without having duly obtained a license as a pharmacist as required by this act, shall be guilty of a misdemeanor.

SEC. 7. Any person entitled to apply for a license as an assistant pharmacist under subdivision first of section three of this act, shall within ninety days after the official publication of the organization of the Board of Pharmacy, make written application to said board for a license, accompanied by a written statement signed by him, and duly verified before an officer authorized to administer oaths within the State, fully setting forth the grounds entitling him to such a license. Said application shall be accompanied by the sum of three dollars, and upon its receipt the said board may, if in session, and if not at its next meeting, grant him a license to practice as an assistant pharmacist within the said county of Erie; but if he shall fail to make the application required by this section within ninety days after the organization of said Board of Pharmacy, he shall then be required to pass an examination satisfactory to a majority of said board. Any person not entitled to apply for a license under said subdivisions first and second of section three of this act, as an assistant pharmacist, and desiring a license as such, shall make a written application for the same to the Board of Pharmacy hereinafter provided for, accompanied by a written statement signed by him, and duly verified before an officer authorized to administer oaths within this State, fully setting forth the facts required by subdivision third of section three of this act, to entitle him to apply for a license as an assistant pharmacist. Such application shall be accompanied by the sum of five dollars, and upon its receipt the said board shall, if in session, and if not, at its next meeting, examine said applicant; and, if satisfied that such applicant has the requisite knowledge and experience, it shall grant him a license to practice as an assistant pharmacist within said county of Erie.

SEC. 8. Any person employed in any pharmacy or store, for the purpose described in subdivision second of section one of this act, or any person knowingly employing any

person for such purposes, without such person so employed being duly licensed as a pharmacist or assistant pharmacist, as required by this act, shall be guilty of a misdemeanor.

SEC. 9. There shall be established and created in and for Erie county a Board of Pharmacy, in the following manner: Within sixty days after the passage of this act, the president and secretary of the Erie County Pharmaceutical Association shall call a meeting of the members of said association, the time and place for holding said meeting to be duly published in three issues of the official paper of the county, and at such meeting there shall be designated by ballot ten reputable pharmacists doing business within said county of Erie, each of whom shall have had not less than ten years' experience as a dispensing druggist or pharmacist. Notice of such designation, and the names of the parties so designated, shall then be filed with the county judge of said county, and from the persons so designated he shall appoint five who shall constitute the Board of Pharmacy for the county of Erie. The members of the board first appointed under this section shall hold office for the term of one, two, three, four and five years respectively, as hereinafter provided, and until their successors have been duly appointed and qualified. The Erie County Pharmaceutical Association shall annually thereafter, in the manner prescribed in this section, elect or designate three reputable registered pharmacists doing business within the said county of Erie, from which number the county judge shall, in each case, fill the vacancy annually occurring in the board, the appointments under this subdivision being for the full term of five years; provided, however, at the election or designation of nominees hereinbefore provided for, any registered pharmacist or assistant pharmacist of Erie county shall have the right to cast his ballot, and the same shall be duly counted, whether he be a member of the said association or not. In case of the death, resignation, inability or removal from the county of any member of the board before the expiration of his term of office, or in case of any vacancy occurring from any other cause but expiration of term of office, the remaining surviving members of the board shall fill the vacancy from the list of names last submitted, and the person appointed shall be a member of the board for the remainder of the term of his predecessor.

SEC. 10. It shall be the duty of the members of the Board of Pharmacy created by this act, immediately after the receipt of the notification of their appointment, to appear before the clerk of the county, and make and subscribe to an oath properly and faithfully to discharge the duties of their office. And within ten days after the receipt of the notification of their appointment they shall meet and organize, and shall thereupon publish a notice of the organization so effected, for one week in the official paper of the county, giving full and explicit information to whom applications for registration and licenses must be addressed. The term of office of the several members first appointed under section nine shall be determined by lot. They shall immediately thereafter proceed to organize by electing a president and secretary, who shall hold their office for one year and until their successors are elected. The board shall hold meetings at least once in three months, or as much oftener as the business of the board may require. The secretary shall give each member of the board not less than five days' notice of each meeting. Three members shall constitute a quorum.

SEC. 11. It shall be the duty of the board to examine all persons applying for examination under this act, and to grant licenses to such persons as may be entitled to a license according to the provisions of this act. It shall be the duty of the board to investigate all complaints of disregard, non-compliance, or violation of the provisions of this act, and to bring the same to the notice of the proper prosecuting officer, as provided for in this act, whenever there appear to the board reasonable grounds for such action.

SEC. 12. Licenses granted by legally constituted Boards of Pharmacy outside of this State may be recognized by this Board of Pharmacy. The licenses under which any

pharmacist, within the meaning of this act, practices his profession shall be conspicuously displayed in the pharmacy or store in which he does business. Any failure to comply with this requirement shall be deemed a misdemeanor.

SEC. 13. There shall be two standards or grades of examination. One for pharmacists, which shall be conducted with a view to ascertain the fitness of the individual to act independently as principal or in sole charge of a pharmacy where physicians' prescriptions are dispensed, and where drugs, medicines and poisons are sold. Another for assistant pharmacist, which shall be conducted with a view to ascertain the fitness of the individual to compound and dispense physicians' prescriptions, and to be intrusted with the handling, care, and sale of poisons, under the directions of a licensed pharmacist. In case of failure to pass a satisfactory examination, a second examination shall be granted within six months, without further payment. But for any and all further examinations there shall be paid the same fee as for the first examination.

SEC. 14. It shall be the duty of the secretary of the Board of Pharmacy created by this act to provide and keep a book of registration in some convenient place, in which shall be entered all applications for registration and examination, said record to embrace the name and place of business of the applicant, the purpose of the application, the facts justifying the claim, and the action of the board in each case. It shall be the duty of the secretary of the Board of Pharmacy also to keep on file in the office of the county clerk, in a book to be provided by the said county clerk, a record of all registrations made or licenses issued, giving the name and address of persons so registered, and the grade of registration. It shall be the duty of the secretary of the Board of Pharmacy to safely keep all books, papers, and records pertaining to the board, and at the expiration of his term of office deliver the same, together with any unexpended funds of the board, to his successor in office.

SEC. 15. The members of the Board of Pharmacy created by this act shall receive a sum not exceeding three dollars for each day engaged in the service of the board, and all legitimate and necessary disbursements. The secretary shall receive such additional compensation as the board may direct. All moneys shall be held by its secretary for meeting the expenses of said board, he giving such bonds as the board may, from time to time, direct. All expenses incurred by said board shall be paid out of the fees collected under this act.

SEC. 16. From and after the passage of this act, it shall be unlawful for any person within the said county of Erie to sell at retail or furnish any of the poisons named in the schedules hereinafter set forth, without affixing, or causing to be affixed, to the box, bottle, vessel, or package, a label containing the name of the article, and the word "poison" distinctly shown, with the name and place of business of the seller, all printed in red ink, together with the name of such poisons printed thereupon in plainly legible characters; which schedules are as follows, to wit:

SCHEDULE A.

Arsenic and its preparations, corrosive sublimate, cyanide of potassium, hydrocyanic acid, oil of bitter almonds, strychnia, morphia, and all other poisonous alkaloids and their salts; opium and its preparations containing more than two grains of opium or its equivalent to the ounce.

SCHEDULE B.

Aconite, belladonna, cantharides, colchicum, conium, cotton root, creasote, digitalis, ergot, henbane, nux vomica, savin, and their pharmaceutical preparations; chloral hydrate, chloroform, croton oil, carbolic acid, oil of tansy, white precipitate, red precipitate, biniodide of mercury, oxalic acid, sulphate of zinc, acetate of lead, and the mineral acids.

Every person who shall sell or dispose at retail, or furnish any poisons included under

schedule A, shall, before delivering the same, make, or cause to be made, an entry in a book kept for that purpose, stating the date of sale, the name and address of the purchaser, the name and quantity of the poison, the purpose for which it is represented by the purchaser to be required, and the name of the dispenser; such book to be always open for investigation by the proper authorities, and to be preserved for at least five years after the last entry. He shall not deliver any of said poison without satisfying himself that the purchaser is aware of its poisonous character, and that the said poison is to be used for a legitimate purpose. The foregoing portions of this section shall not apply to the dispensing of medicines or poisons on physicians' prescriptions. Wholesale dealers in drugs, medicines, pharmaceutical preparations, or chemicals, shall affix, or cause to be affixed, to every bottle, box, parcel, or outer enclosure of an original package containing any of the articles enumerated in schedule A of this act, a suitable label or brand with the word "poison" upon it; but they are hereby exempt from any registration of the sale of such articles, when in the usually recognized wholesale quantities. Any person failing to comply with the requirements of this section shall be guilty of a misdemeanor.

SEC. 17. Any person who shall procure or attempt to procure a license under this act, by making, or causing to be made, any false representation, shall be guilty of a misdemeanor.

SEC. 18. Nothing in this act shall apply to the business of a practitioner of medicine who does not keep a store for the retailing of medicines or poisons, nor to the exclusively wholesale business of any dealers, except that portion of section sixteen which relates to the labeling or marking of certain poisons mentioned in this act. And nothing in this act shall prevent or prohibit the employment, in any pharmacy, of apprentices or junior assistants, for the purpose of being instructed in the practice of pharmacy; but such apprentices or junior assistants shall not be permitted to prepare and dispense physicians' prescriptions, or to sell or furnish poisons, except in the presence of, and under the personal supervision and responsibility of a licensed pharmacist or assistant pharmacist. And nothing in this act shall prohibit the manufacture or sale of patent or proprietary medicines; and nothing in this act shall prohibit the sale of the usual domestic remedies put up by a registered pharmacist, or by a wholesale dealer, and bearing their respective labels.

SEC. 19. Said board shall not grant a license to an applicant if satisfied that the safety of the public would be endangered by reason of the habitual negligence of such applicant, or if such applicant be addicted to such habits as would make it improper to grant the license.

SEC. 20. If any person to whom a license shall be granted under this act shall become unfit or incompetent, by reason of negligence, habits, or other cause, to practice as a pharmacist, or assistant pharmacist, or if any such person shall wilfully violate any of the provisions of this act, the said board shall annul his license, after giving such person reasonable notice and an opportunity to be heard.

SEC. 21. The penalties prescribed by this act shall be recovered by suits in the name of the people of this State, according to the statutes in such cases made and provided, to be prosecuted by the district attorney of the county. Whenever suits are prosecuted by the district attorney, the fines collected shall be paid to the county treasurer of said county.

SEC. 22. This act shall take effect immediately.

STATE OF NEW YORK, }
Office of the Secretary of State. } SS.:

I have compared the preceding with the original law on file, and do hereby certify that the same is a correct transcript therefrom, and of the whole of said original law.

JOSEPH B. CARR, *Secretary of State.*

IV.—PHARMACY LAWS OF MILWAUKEE (SUPERSEDED BY THE WISCONSIN PHARMACY LAW OF 1882.)

CHAPTER 257, LAWS OF 1876.

AN ACT TO REGULATE THE PRACTICE OF PHARMACY AND THE SALE OF POISONS, AND TO PREVENT ADULTERATIONS OF DRUGS AND MEDICINAL PREPARATIONS IN THE CITY OF MILWAUKEE.

The People of the State of Wisconsin, represented in, Senate and Assembly, do enact as follows :

SECTION 1. That it shall be unlawful in the city of Milwaukee, for any person, unless a registered pharmacist, or registered assistant pharmacist, within the meaning of this act, except as an aid or apprentice, under the immediate supervision of a registered pharmacist or a registered assistant pharmacist, to retail, compound or dispense medicines or poisons except as hereinafter provided.

SEC. 2. Any person, in order to be registered in the meaning of this act, must either be a graduate in pharmacy, a practising pharmacist, or a practising assistant pharmacist.

SEC. 3. Graduates in pharmacy must be such as have had three years' experience in a store where the prescriptions of medical practitioners are compounded, and have obtained a satisfactory diploma or credentials of their attainments from a regularly incorporated college or school of pharmacy, either of the United States or of a foreign country and the degree of which shall be "Graduate in Pharmacy." Practising pharmacists, in the meaning of this act, within this city, shall be such persons only as at or prior to the passage of this act, have kept, and continue to keep open store for the compounding and dispensing the prescriptions of medical practitioners, and for the sale of drugs and medicines. Practising assistant pharmacists shall be such persons of not less than 18 years of age, as at or prior to the passage of this act have been, or may be employed in the compounding of prescriptions of medical practitioners, in the store of a practising pharmacist in this city, and shall furnish satisfactory evidence of their attainments and competency to the Board of Pharmacy; and hereafter no person except a graduate in pharmacy, within the meaning of this act, shall be qualified for registration, either as a registered pharmacist or a registered assistant pharmacist, unless he shall have had three years experience in a store, where the prescriptions of medical practitioners are compounded, and shall have passed an examination before the Board of Pharmacy, hereinafter provided.

SEC. 4. On or before the first day of August, 1876, the apothecaries of the city of Milwaukee, in a meeting, shall nominate six of the most skilled pharmacists at the time engaged in said business in said city, out of which number the Mayor of the city of Milwaukee shall, within thirty days thereafter, appoint three persons, one for one year, one for two years and one for three years, who shall constitute the Board of Pharmacy. Each year after, in a meeting of the registered pharmacists, two registered pharmacists shall be nominated, out of which the Mayor of the city shall appoint one for the term of three years. The members of the board shall, within thirty days after their appointment, individually take and subscribe an oath of office faithfully and impartially to discharge the duties prescribed by this act. They shall hold office until their successors are appointed and qualified, and in case of vacancy by removal from the city, ceasing to do business as a registered pharmacist, or from any other cause, the mayor of the city shall fill such vacancies by appointment from the number of registered pharmacists of the city. The members of the board shall organize for the transaction of business within one week after their appointment, and annually thereafter, by the election of one of their number as President, and one of their number to act as secretary and treasurer. The board shall meet as often thereafter as necessary, at least once every month.

SEC. 5. The duties of the Board of Pharmacy shall be to examine all candidates presenting themselves; to direct the registration by the secretary of all persons properly qualified or entitled under this act, and to cause the prosecution of all persons violating its provisions. Pharmacists applying to the Board of Examiners shall pay a fee of five dollars, and upon passing a satisfactory examination, and having otherwise complied with the provisions of this act, the board shall furnish a certificate to the applicant without additional charge. From said five dollars each of the members of the board shall be paid a compensation of one dollar for each examination. All expenses arising under this act shall be paid out of the moneys received by said board, and any surplus moneys may be used or appropriated for such purposes as the registered pharmacists of said city, in their annual meeting, may from time to time determine.

SEC. 6. The duties of the secretary and treasurer shall be to keep a book for the registration of pharmacists and assistant pharmacists at some convenient time, to be designated by the Board of Pharmacy, of which he shall give due notice through the public press in the city of Milwaukee, and in which shall be entered, under the supervision of the Board of Pharmacy, the names, titles, qualification, and places of business of all coming under the provisions of this act; and it shall be the duty of all such persons to see that they are registered within a period of thirty days after the organization of the Board of Pharmacy. The fee to be paid to the board for the registration of graduates, practising pharmacists, and assistant pharmacists, under this act, without examination, shall be one dollar; and it shall be the duty of every person registered to have his registration renewed every year, the fee for which shall be fifty cents; and upon changing his place of business or engagement, to notify the Secretary within thirty days. The Secretary shall be paid a compensation for each first registration, fifty cents, and for each renewal twenty-five cents, out of the moneys received for registrations. The Secretary shall make all necessary alterations in the register, and notify all persons who shall not have renewed their registration to do so within thirty days, for which services the party notified shall pay a fee of fifty cents to the board; and, in case no answer is received before the expiration of such notice, the name of the party so notified shall be erased, unless an excuse satisfactory to the board be presented; provided, always, that the said name shall be restored only on payment of five dollars to the board within one year. The Secretary shall receive all moneys belonging to the board, and give receipts therefor. He shall disburse the moneys under the direction of the board; shall keep an accurate account, which shall always be subject to the inspection of the board; he shall give good and sufficient bonds, payable to the Board of Pharmacy, for the faithful performance of his trust, which shall be satisfactory to and approved by the Board of Pharmacy. He shall also report annually to the mayor of the city upon the conditions of pharmacy, together with the names of all registered pharmacists and assistant pharmacists duly registered under this act.

SEC. 7. Any person not a registered pharmacist, who shall, thirty days after said board is organized, keep open shop for retailing or dispensing of drugs, medicines, and poisons, or who shall use the title of registered pharmacist or registered assistant pharmacist, shall for every such offense be deemed guilty of a misdemeanor, and, on conviction, shall be liable to a penalty of not less than fifty dollars nor more than two hundred dollars.

SEC. 8. Any registered pharmacist who shall knowingly, intentionally, or fraudulently adulterate, or cause to be adulterated, any drugs, chemical, or medicinal preparations, intended for medical purposes, shall be held guilty of a misdemeanor; and, upon conviction thereof, shall pay a penalty not exceeding five hundred dollars, nor less than fifty dollars, and shall forfeit to the City of Milwaukee all the articles adulterated.

SEC. 9. From and after the first day of August, 1876, it shall be unlawful for any person in the City of Milwaukee to retail any poisons enumerated in schedules A and B,

appended to this act, without distinctly labeling the bottle, box, vessel, or paper and wrapper, or cover in which said poison is obtained, with the name of the article, the word "poison," and name and place of business of the seller. Nor shall it be lawful for any person to sell or deliver any poison enumerated in schedules A and B to any person, unless, on due inquiry, it is found that the person is aware of its poisonous character, and that it is to be used for a legitimate purpose. Nor shall it be lawful for any person to sell or deliver any poison included in schedule A without, before delivering to the buyer, making or causing to be made an entry in a book kept for that purpose only, stating the date of the sale, the name and address of the buyer, the quantity of poison sold, the name of the poison, for what purpose, and the name of the dispenser. Said book to be kept always open for the inspection of the proper city, county, and State authorities, and to be preserved at least five years. The provisions of this section shall not apply to the dispensing of physicians' prescriptions, but all prescriptions shall be carefully filled by the pharmacist, and numbered in the order in which they are dispensed. Said prescriptions must be preserved at least five years, and a copy must be furnished by the pharmacist, if demanded by either the writer or the purchaser, for which copy no fee shall be exacted.

SEC. 10. Nothing in this act shall apply to or in any manner whatever interfere with the business of any practitioner of medicine who does not keep open shop for the retailing, dispensing, or compounding of medicines and poisons, nor prevent them from administering or supplying their patients such articles as may seem to them fit and proper nor shall it interfere with the business of wholesale dealers of drugs and chemicals, in sales to retailers and physicians, or for use in the arts; nor with the making and dealing in proprietary remedies, popularly called patent medicines, nor shall the provisions of this act apply to practising homeopathic physicians who do not keep a retail apothecary store. Schedule A: Arsenic and its preparations, corrosive sublimate, white precipitate, red precipitate, bin-iodide of mercury, cyanide of potassium, hydrocyanic acid, strychnia. Schedule B: All poisonous vegetable alkaloids and their salts, aconite, belladonna, colchicum, conium, nux vomica, henbane, savin, ergot, cotton root, cantharides, digitalis, and their pharmaceutical preparations, croton oil, chloroform, chloral hydrate, sulphate zinc, sugar lead, mineral acids, carbolic acid, oxalic acid, opium and its preparations, except paregoric and all preparations of opium containing less than two grains to the ounce.

SEC. 11. This act shall take effect and be in force from and after the first day of August, A. D. 1876, and all acts and parts of acts contravening the provisions of this act are hereby repealed.

REPORT OF COMMITTEE ON EXHIBITION.

Turn-Halle, the place where the exhibition was held, was well adapted for such purpose, it being large, well lighted and ventilated. The display was elaborate, of unusual magnitude, comprehensiveness, and interest, for the success of which much credit is due Local Secretary Henry C. Schranck. In addition to the members and local pharmacists, a continuous throng of citizens visited the hall. Much noise and confusion was created, whereby the proceedings of the Association, at its sessions held in the room underneath, were materially interfered with.

The Committee are not able to furnish such a report as the character of

the exhibition would seem to warrant. This is due to the very short period of time at their disposal, and an almost entire disregard of advice given by former committees of the Association—"that exhibitors at as early a date as possible furnish the committee with a full and exact statement of the articles exhibited."

The arrangement of exhibitors is by an alphabetical list of States.

ALABAMA.

P. C. Candidus, Mobile.—Exhibits one pear, 21 oz. in weight, grown in Mobile. Although the exhibitor is a member of the Committee on Exhibition, we had no opportunity of judging the value of this exhibit.

ILLINOIS.

Bartlett & Butman, Chicago.—Exhibit trusses, bandages, braces, supporters, elastic stockings in great variety.

W. G. Baxter, Chicago.—Exhibits cigars.

Henry Biroth, Chicago.—Exhibits a poison closet designed to assist the pharmacist in the prevention of mistakes in dispensing. It is a small wooden case of neat design, yet having space for all the frequently-used poisons.

For description and advantages, see report of discussion upon a paper read before the Association by Mr. Biroth.

T. W. Heinemann, Chicago.—Exhibits a large assortment of his manufactures, consisting of court plasters in every variety, corn plasters, isinglass and adhesive plasters, mustard leaves on muslin, suspensories, shoulder-braces, supporters, trusses, chest-protectors, powder puffs.

Holway, Wright & Rich, Chicago.—Exhibit lime-fruit juice and cordials, fruit and medicated lozenges, cachous, chocolate, liquid glue, toilet soap.

W. T. Keener, Chicago.—Medical and Pharmaceutical books and periodicals, including the latest editions of American, English and German text-books.

Jas. S. Kirk & Co., Chicago.—Exhibit toilet soaps and perfumery in great variety.

H. S. Maynard, Chicago.—Exhibits a variety of gelatin-coated pills and granules.

Morrison, Plummer & Co., Chicago.—Exhibit drugs, essential oils, fluid extracts, chemicals, pharmaceutical preparations, perfumery, indelible ink, Troemner's balances, Herrick's water still, Osborne's meat-juice press, an old mortar—a relic from the Chicago fire.

Pictorial Printing Co., Chicago.—Exhibit cut and gummed labels, powder envelopes, prescription blanks, powder papers, folding boxes, prescription files, pill and powder boxes with or without labels, label cabinet.

E. H. Sargent & Co., Chicago.—A large exhibit of pure chemicals, chemical and pharmaceutical apparatus, materials, utensils and instruments of every description required by assayers, physicians and druggists.

R. W. Tansill & Co., Chicago.—Exhibit cigars.

Western Label Co., Chicago.—Miscellaneous labels for druggists' and physicians' prescription papers.

Allen B. Wrisley, Chicago.—Exhibits toilet soaps, Florentine Cologne, and other toilet waters, bay rum.

IOWA.

Victor M. Law, M. S., M. D., Cedar Rapids.—Exhibits a new automatic rapid filter.

It is adapted to filtering a few drops or many gallons. Its construction allows of no loss from evaporation. The paper used is ordinary filtering paper laid flat, being about three inches in diameter and not subject to breakage while in use. It is small and easily handled, and the paper can be changed in a moment. It does its work thoroughly, and without attention. Syrupy liquids are filtered rapidly. It may be used to collect precipitates. From its simplicity, cheapness, and efficiency, the filters seem destined for extended use in pharmacy and the laboratory.

MARYLAND.

Burrough Bros. Mfg. Co., Baltimore.—Exhibit medicinal extracts, fluid and solid.

Henry F. Miller, Baltimore.—Exhibits druggists' seamless tin boxes in large variety, suitable for every purpose to which such ware is adapted.

J. H. Winkelmann & Co., Baltimore.—Exhibit perfumery.

MASSACHUSETTS.

The Avery Lactate Co., Boston.—Exhibit a new acid drink composed in part of lactic acid.

Doliber, Goodale & Co., Boston.—Exhibit Mellin's food for infants and invalids.

Canning & Patch, Boston.—Exhibit Patch's improved pill coater, for coating pills with gelatin at the dispensing counter.

G. L. Hergert, Boston.—Exhibits metallic hair brushes, hand mirrors, tooth, nail, infant and hair brushes, shaving mugs and brushes, fancy cutlery.

The Sparrow Kneader and Mixer Company, Boston.—Exhibit the Centrifugal Mixer in several sizes. This machine is adapted to mixing powders, ointments, and emulsions.

Henry Thayer & Co., Cambridgeport.—Exhibit fluid and solid extracts, resinoids and also resins gelatin, and sugar-coated pills, medi-

cated lozenges, elixirs, wines, syrups, pure and saccharated pepsin, aromatic cachous.

J. W. Colcord, Lynn.—Exhibits Colcord's improved syphon tap, for drawing ale, porter, champagne or mineral waters. Also displayed sachet powders.

MICHIGAN.

A. M. Todd, Nottawa.—Exhibits pip-menthol made from American oil of peppermint.

MISSOURI.

The Mallinckrodt Chemical Works, St. Louis.—Exhibit carbolic acid crystals, pure white; bismuth subnitrate, very light and bulky; chloroform, pure for inhalation; potassium iodide and bromide, in crystals and granulated; acetate of potassium, phosphate of soda, sulphate of iron, sulphate of copper, hyposulphite of soda, acetic acid chemically pure, resublimed carbonate of ammonium and iodine, citrate of iron and quinine, and other scale preparations, mercurials, hypophosphites, chloral hydrate in flakes and crystals, ether, iodoform in crystals and powder, potassium cyanide, salicin, strychnia, tannin, and chemically pure oxide of zinc.

NEW YORK.

A Committee Representing the New York and Brooklyn Formulary.—Exhibit elixir simplex, elixir curassao, elixir ammonii valerianatis, elixir anisi, elixir taraxaci compositum, spiritus aromaticus, syrupus phosphatum compositum.

The design of this exhibit is to illustrate the effort made to furnish uniform preparations, that the medical fraternity might "abstain hereafter from designating the maker's name" of any preparation for which a formula is found in the pamphlet. This is a commendable effort, and worthy of extended application.

American Star Capsule Works, New York.—Exhibit six sizes of empty gelatin capsules.

The Chesebrough Manufacturing Company, New York.—Exhibit petroleum jelly, petrolatum, and ointments, confections, cold cream and soaps containing it.

George V. Hecker & Co., New York.—Exhibit cereal foods prepared from wheat, corn, oats and buckwheat.

Lehn & Fink, New York.—This exhibit was one of the most interesting and instructive to the pharmacist; here could be seen drugs that have been in use in pharmacy from its earliest history to its latest development. It consisted of 250 specimens of select roots, barks, flowers, seeds, and herbs; a collection containing 300 organic chemicals, salts, alkaloids, active principles, etc.; essential oils, ethers, acids, all of such quality as to correspond to the requirements of the Pharmacopœia; all

the latest coal-tar products, used in medicine, as naphtalin, beta-naph-tol, kairin, antipyrin, metallic elements, models illustrating the various forms of crystallization, chemicals, Norwegian cod-liver oil, glass wool for filtering and surgical purposes, traumaticum, a solution of gutta-percha used for the same purpose as collodion, cleansed Irish moss free from all inert matter, large vials of hyoscyamine, pure white crystals, pilocarpine muriate, eserine, curarii sulphas, caffeine, resorcin, duboisia sulphas, aloin, chrysophanic acid, thymol, tannate mercury, guarana seed, powdered Russian licorice root.

McKesson & Robbins, New York.—Exhibit in two cabinets of original design, gelatin-coated pills, fruit juices, fluid extracts, abstracts, quinine, quinidine, cinchonidine, cinchonine, morphia, concentrated waters, vanillin, pharmaceutical preparations, crude drugs in original packages, viz., oil of cassia, oil of star anise, Ceylon cinnamon, vanilla beans, coca leaves, Turkey colocynth, Honduras sarsaparilla, two grades, Mexican sarsaparilla, China rhubarb, high dried, Canton rhubarb, medium flat, large flat, medium round, large round, Shensi rhubarb, large round, medium round, medium flat, large flat.

John Matthews, New York.—Carbonic acid water apparatus, steel fountains, coolers, generators, tumblers and holders, various supplies, and their "Acid Dispenser." The fountains are supplied with portable glass syrup jars, and other improvements.

Miles Brothers & Co., New York.—Exhibit hat, hair, tooth, and nail brushes, mirrors plain and fancy mounted, wall pockets, and other druggists' sundries and toilet conveniences.

Theodore Ricksecker, New York.—Exhibits perfumes and specialties in great variety and attractive styles. The goods were well arranged in a patent upright case made by The Exhibition Show Case Co., of Erie, Pa.

W. H. Schieffelin & Co., New York.—Exhibit soluble coated pills, fluid, solid, and powdered extracts, tinctures, elixirs, oleates, scale preparations, syrups and elixirs of hypophosphites, sublimate soap, concentrated nitrous ether, powdered drugs prepared in their own mills, chemicals and pharmaceutical preparations.

Seabury & Johnson, New York.—Exhibit India rubber porous plasters in every variety of this kind of plaster, mustard, bunion, corn, court, and adhesive plasters, absorbent and antiseptic dressings.

Columbia Chemical Works, Brooklyn.—Exhibit Kieserite, magnesium sulphate, magnesium carbonate.

Young & Smylie, Brooklyn.—Exhibit extract of licorice in various forms, lozenges, pellets, and wafers, the composition of which is in part their extract of licorice.

Irondequoit Wine Co., Rochester.—Exhibit American grape wines, port, Catawba, and sherry. The sherry wine has a natural flavor, and is not made to imitate imported sherry.

OHIO.

W. D. Freeman, Cincinnati.—Exhibits—Toilet powder, manicure sets.

W. J. M. Gordon, Cincinnati.—Glycerin of quality and purity suitable for pharmaceutical purposes.

Wm. S. Merrell Chemical Co., Cincinnati.—This firm exhibit a large and varied line of chemical and pharmaceutical preparations; green drug fluid extracts; gelatin and sugar-coated pills; empty capsules; pink granules; hydrastia and other alkaloids; salicylic acid.

The Torsion Balance and Scale Company, Cincinnati.—Exhibit balances constructed on a new principle and novel in construction. No knife edges, they are claimed to be delicate, but strong and accurate.

PENNSYLVANIA.

Wm. B. Burk & Co., Philadelphia.—A large exhibit of fine toilet and bathing sponges; natural sheep's wool sponge; sanitary sponge.

Eastman & Brothers, Philadelphia.—Made an inviting display of perfumery and toilet soaps.

Gillam's Sons, Philadelphia.—Displayed over 4,000 designs of cork tops and embossed envelopes elegant in design, thus enabling the druggist, at a very small outlay, to give a finish to his goods.

E. F. Houghton & Co., Philadelphia.—Exhibit petrolatum and a full line of ointments made from this base. They were well made and are handsome pharmaceutical products.

Powers & Weightman, Philadelphia.—Have on exhibition a collection of chemicals of their manufacture, the most noticeable being preparations from opium and cinchona bark; iodide and bromide of potassium; nitrate of silver; strychnia and salts; mercurials; iron preparations in scales, and many other articles of interest, the whole arranged in attractive form.

Henry Troemner, Philadelphia.—Exhibit elegant druggist's counter-scales of various patterns; the solution scale; fine prescription scales; analytical balances of perfect construction; weights of all kinds, every article being of the best workmanship.

Turner & Wayne, Philadelphia.—Exhibit tooth brushes.

Wm. R. Warner & Co., Philadelphia.—Exhibit pharmaceutical products, including sugar-coated pills, granules, parvules, elixirs, lozenges, granulated effervescent salts, fluid extracts, cachous, sachet powders and perfumes.

Whitall, Tatum & Co., Philadelphia.—Exhibit a very complete line of glasswares used by druggists, chemists, and perfumers. Their graduate measures and apparatus are worthy of mention. Stoppers for bottles containing poisons as dispensed in prescription vials are well calculated to save accidents to persons who are disposed to take medicine without reading the labels.

John Wyeth & Brother, Philadelphia.—Exhibit fluid extracts, elixirs, compressed pills, compressed lozenges, C. P. boracic acid, menthol crystals, absorbent cotton, cod liver oil.

Solar Manufacturing Co., Philadelphia.—Exhibit natural fruit juices.

RHODE ISLAND.

Millard Manufacturing Co., Providence.—Exhibit atomizers with continuous spray—several styles adapted for special uses; syringes with jet pipes.

TENNESSEE.

Yeager & Heath, Knoxville.—Exhibit Turner's patent improved oil cans, of several sizes; a novel apparatus for the druggist, used in dispensing castor oil, glycerin, etc. It is always neat and clean, bottles being readily filled by its use. Oil tanks for kerosene and turpentine.

VIRGINIA.

The Randolph Paper Box Co., Richmond.—Exhibit over a thousand varieties of handsome pill, powder, and ointment boxes, labeled and unlabeled, elegant puff boxes, powder papers, and writing pads.

WISCONSIN.

Woodward Lock Co., Clinton.—The champion soap cutter, for cutting soap, roots, herbs, camphor, wax, etc.

Huber & Fuhrman Drug Mill, Fond Du Lac.—Exhibit indigenous roots, barks, and herbs; also the same drugs pressed, ground or powdered.

Baumbach & Rosenthal, Milwaukee.—Exhibit sponges, some in odd forms, and other marine curiosities obtained from the sponge fisheries, crude drugs, powdered drugs, thymol, menthol, and essential oils.

Brunnquell & Rohde, Milwaukee.—An extensive exhibit of books on pharmacy and cognate branches in the English and German languages.

H. Bosworth & Sons, Milwaukee.—Exhibit a large and handsome collection of fancy goods and druggists' sundries.

Delorme & Quentin, Milwaukee.—Exhibit fine toilet soaps in great variety; transparent glycerin soaps.

F. Dohmen Company, Milwaukee.—Exhibit original packages of opium, vanilla beans, cardamom seeds, saffron, essential oils, Loxa bark, Merck's chemicals, roots, herbs, flowers, chemical apparatus; the whole

surmounted by a striking sign in red, white and blue letters of crystals of potassium chromate, potassium sulphate and copper sulphate.

Green Button Co., Milwaukee.—Exhibit toilet articles, fancy goods, perfumes, Florida water, manicure sets.

Aug. Greulich & Son, Milwaukee.—Exhibit wines and liquors; native wines, and grape juice.

Goodyear Rubber Co., Milwaukee.—Exhibit rubber bands, tubing, stoppers, cushions, syringes, and various kinds of rubber goods used in pharmacy.

S. C. Herbst Importing Co., Milwaukee.—Exhibit American and foreign mineral waters, wine and liquors.

E. L. Hustine, Milwaukee.—Exhibit Medical Lake mineral water, a natural water from Medical Lake, Spokane Co., Washington Territory.

Milwaukee Soap Co., Milwaukee.—Exhibit soap for the destruction of vermin.

New York Cigar Co., Milwaukee.—Exhibit cigars of various brands.

Schorse & Co., Milwaukee.—Exhibit antiseptic materials, bandages, dressings, absorbent cotton and other goods of this class.

The Waukesha Spring Co., Milwaukee.—Exhibit the Waukesha Spring Water, a delicious table and hygienic mineral spring water.

Otto Zwietsch, Milwaukee.—Exhibits mineral waters and apparatus for bottling, generators, fountains, apparatus for dispensing mineral waters. The fountain displayed was supplied with glass syrup tanks and faucets.

Horlick's Food Co., Racine.—Exhibit Horlick's food for infants and invalids and dry extract of malt.

Hamilton & Katz, Two Rivers.—Exhibit frames with interchangeable letter signs.

The University of Wisconsin.—A case containing samples of products made by its students in its chemical and pharmaceutical laboratories. These were well made, and reflected credit upon their producers. They compare favorably with the very best specimens of chemical and pharmaceutical products of the large manufacturers.

PHARMACEUTICAL JOURNALS.

The American Journal of Pharmacy.

Weekly Drug News and Prices Current, New York.

Pharmaceutical Record, New York.

American Druggist, New York.

Deutsch-Amerikanische Apotheker Zeitung, New York.

Pharmaceutische Rundschau und Zeitung, New York.

The Formulary, Westfield, New York.

The Druggist, Chicago.

National Druggist, St. Louis.

The Druggists' Journal, Philadelphia.

The Daily Druggist, Milwaukee. Special by "The Druggist," of Chicago, complimentary to the A. P. A. and the N. R. D. A.

Respectfully submitted,

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SPECIAL REPORTS AND ESSAYS.

I. PHARMACY.

A SET OF STANDARD DIMENSIONS FOR SIMPLE PERCOLATORS.*

BY OSCAR OLDBERG.

All the ready-made percolators obtainable in the market up to this time are absurd as to their proportions, and should be discarded as soon as percolators of proper form and dimensions can be found. They are much too short in proportion to their diameter, a glass percolator seventeen inches in length, being ten inches in diameter at the top, when it ought to be about three inches. They are generally of very irregular form, and instead of being very slightly conical, they are either perfectly cylindrical or as tapering as a sugar loaf. In most of them, the tops are so irregular that they cannot be covered tightly when desired. Their stems are badly shaped, and of too small bore, so that it is frequently difficult, and sometimes impossible, to insert the cork.

The object of this paper is to present to my fellow pharmacists, in a concise manner the practical lessons taught in our extensive literature on percolation, so far as relates to the apparatus, and to suggest how we may utilize these lessons. I propose to summarize the conclusions to be derived from the able and exhaustive studies of Dr. Squibb, Professors Diehl, Lloyd, Remington, and others, which agree with my own experience. There will be nothing new, therefore, in the propositions here submitted; but I feel that a use will be performed by placing them together so that they may be reviewed with ease:

1. Simple percolation is on the whole the best form of percolation in the hands of pharmacists operating on a small or moderate scale, being easier and safer, and yielding, when the official directions are followed, more uniform results. Re-percolation, or fractional percolation, can be profitably carried out on a comparatively large manufacturing scale. Simple percolation is accordingly the process to which preference has been given in the Pharmacopœia of the United States.

* Read at the Fourth Session.

2. Simple percolators, when properly constructed and used, are decidedly preferable to any patent apparatus with which I am acquainted, both in point of economy and efficiency.

3. Tall and narrow percolators—considerably taller in proportion to their diameter than any heretofore obtainable in the market—are necessary to insure the proper exhaustion of the drug with a moderate quantity of menstruum, simple percolation being the process followed.

4. As the sole object of using a tall and narrow percolator is to increase the height of the column of drug and menstruum in proportion to their mass, it is self-evident that, in using any percolator, it is necessary to pack it as neary full as practicable, leaving only just enough space at the top to enable the adding of more menstruum as required.

To use a tall and narrow percolator, packing it only half full is, of course, equivalent to using a shorter percolator.

5. It is, therefore, an imperative rule, that instead of making a certain fixed quantity of fluid extract, or tincture, or other percolate, without sufficient regard to the size of the apparatus available for the operation, we must invariably adjust the quantity of drug to suit the percolator. Thus, if the percolator is large enough for seventeen or eighteen troy ounces, it is wrong to put only sixteen troy ounces in it.

6. From these conclusions, it follows further, that a sufficient variety of sizes of percolators must be found in the shop or laboratory of every pharmacist who has the commendable ambition to make his own fluid extracts and tinctures. For each percolate he wishes to make he must have a percolator large enough to obviate any necessity of using it too many times in order to obtain a sufficient quantity of product, and at the same time sufficiently small to enable him to fill it without obtaining a greater quantity of product than he can use.

7. There are not now in the market any percolators which reasonably fulfill the requirement necessary to enable the pharmacist to conveniently carry out the official directions for percolation under circumstances favorable to satisfactory results.

These considerations led me to adopt a set of fixed dimensions for percolators such as are, in my opinion, most suitable for general use in the preparation of fluid extracts and other preparations in accordance with the excellent details of manipulation given in the latest revision of the *Pharmacopœia* of the United States (pages xxxvi. and xxxvii.). These dimensions have been adopted by the Chicago College of Pharmacy for the percolators to be used in its new pharmaceutical laboratory, and are herewith presented in tabular form :

STANDARD PERCOLATORS OF THE CHICAGO COLLEGE OF PHARMACY.

Numbers	Approximate Capacity.		Length of Body.		Internal Diameter at the Top.		Internal Diameter of Body at the Shoulder.		Depth of Shoulder.		Length of Stem (or Neck).		Internal Diameter of Stem at the Throat.		Internal Diameter of Stem at Mouth or Exit.		Length of Rubber Tube.		Numbers
	C. c.	U. S. Fluid Measure.	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters	Inches	
1	90	3 fl. oz.	150	5.99	30	1.181	25	.984	4	.157	30	1.181	10	.394	12	.472	300	7.87	1
2	150	"	180	7.09	36	1.417	30	1.181	6	.236	30	1.181	10	.394	12	.472	240	9.45	2
3	240	"	210	8.27	42	1.654	35	1.378	8	.315	30	1.181	10	.394	12	.472	280	11.02	3
4	360	"	240	9.45	48	1.890	40	1.575	10	.394	30	1.181	10	.394	12	.472	320	12.60	4
5	530	"	270	10.63	54	2.126	45	1.772	12	.472	35	1.378	13	.512	15	.591	360	14.17	5
6	740	"	300	11.81	60	2.362	50	1.968	14	.551	35	1.378	13	.512	15	.591	400	15.75	6
7	1,240	"	360	14.17	72	2.835	60	2.362	16	.630	35	1.378	13	.512	15	.591	480	18.89	7
8	1,960	"	420	16.53	84	3.307	70	2.756	18	.709	35	1.378	13	.512	15	.591	560	20.05	8
9	3,000	"	480	18.89	96	3.780	80	3.150	20	.787	35	1.378	13	.512	15	.591	640	25.20	9
10	3,780	8 pts.	540	21.25	108	4.252	90	3.543	22	.866	35	1.378	13	.512	15	.591	720	28.35	10
11	5,700	"	600	23.62	120	4.724	100	3.937	24	.945	35	1.378	13	.512	15	.591	800	31.50	11
12	7,600	"	660	25.98	132	5.197	110	4.331	26	1.024	35	1.378	13	.512	15	.591	880	34.65	12
13	9,850	"	720	28.35	144	5.670	120	4.724	28	1.102	35	1.378	13	.512	15	.591	960	37.80	13
14	12,500	"	780	30.71	156	6.142	130	5.118	30	1.181	35	1.378	13	.512	15	.591	1040	40.95	14

That the best proportions for practical work, all things considered, can not be determined with exactness, is obvious. I believe, however, that the dimensions adopted by the Chicago College of Pharmacy will be found as nearly right as it is practicable to make them. The percolators are tall and narrow enough to insure very satisfactory results, and not so tall as to be awkward.

Messrs. Whittall, Tatum & Co., of Philadelphia, are making the percolators for the Chicago College of Pharmacy, and, on my recommendation, they decided to place this style of percolators on their catalogue; and will have them in stock, made exactly according to these patterns, at an early day. It is to be hoped that other manufacturers of glass percolators will also make them.

The cut represents one of these percolators ready for use. The only additional implements required are a proper stand to firmly support the percolator in position, a wooden plunger made of a circular disk of hard wood fixed on the end of a piece of broomstick, a piece of sheet rubber ($\frac{3}{8}$ inch thick), or a piece of plate glass, or of wood, to be used as a cover; a receiving bottle, and a few blocks of wood with which to raise or lower the receiving bottle to regulate the rate of flow during the percolation, as indicated on page xxxvii. of the Pharmacopœia.

A perforated rubber stopple 25 millimeters (1 inch) long, slightly tapering, and of the right diameter to fit the stem of the percolator, is better than an ordinary cork for carrying the exit tube to be inserted in the stem. The glass tubing used should be of about 6 millimeters ($\frac{1}{4}$ inch) external, and 3 millimeters ($\frac{1}{8}$ inch) internal diameter. The exit tube should be 5 centimeters (2 inches) long, thus protruding 25 millimeters (1 inch) beyond the larger or outer end of the rubber stopple or cork, the other end of this tube being flush with the smaller end of the cork. The rubber tube should be five millimeters ($\frac{1}{4}$ inch) internal diameter. The drop tube (glass) at the further end of the rubber tube may be the same length as the exit tube (5 centimeters). These dimensions of cork and tubing will answer for any size of percolator. The length of the rubber tube, however, must be nearly one-third greater than the height of the percolator in each case respectively.

It will be observed that the total depth of each percolator is uniformly five times its large diameter, and six times its small diameter. These percolators are, therefore, very nearly cylindrical.

The tops are ground off, and thus capable of being tightly covered.

The stem is a regular tincture-bottle neck, with the internal diameter greater at the mouth than at the throat, thus admitting of the insertion of the rubber stopple or cork from without instead of from within. In the old percolators, the stem or neck is wider above than below, and hence the Pharmacopœia directs that the cork be inserted from within, which is very inconvenient.

The stem of the new percolators is long enough to properly accommodate the plug of loose cotton to be inserted over the cork. "Absorbent cotton," or any clean, dry, loose cotton, will answer. The sand used must be very coarse, all the fine dust having been sifted and washed out of it, and must be perfectly dry when used. The layer of sand should not be too thick.

Conical percolators are, in my experience, not required for any drug. The new percolators proposed are sufficient for all purposes, provided the general official directions are followed with a reasonable amount of intelligence and discretion. It is important that the moistened drug shall be permitted to remain loosely shaken together in the percolator sufficiently long to become thoroughly permeated by the moisture before being

packed, and that the subsequent packing be done with care, and with the requisite degree of relative firmness. The packed mass pushes upward when swelling takes place, and when a conical percolator is used the consequence is that a space is formed all around between the drug and the inner surface of the percolator, necessitating constant watching and mending. The evil is largely avoided in cylindrical percolators.

Each pharmacist who desires to use these new percolators will, of course, select those sizes only which he deems necessary for the requirements of his own business; but it is scarcely probable that any large pharmaceutical establishment, where fluid extracts and tinctures are constantly being made, can get along with a less extensive assortment than numbers 2 to 13 inclusive. Size No. 1 is intended chiefly for experimental work. It is suggested to those who might consider the entire set too expensive, that one-half the set, consisting of either the even or the uneven numbers, will probably prove more useful than a less equally graded assortment. I believe, however, that the saving in labor and material will more than compensate for the expense of a whole set of these percolators. My understanding is that they will be sold singly as well as in sets, so that any purchaser can get just what he wants. I believe they will be sold at as low prices as the laws of supply and demand may dictate, as no one has any proprietary or exclusive right in either their manufacture or sale.

SIMULTANEOUS FRACTIONAL PERCOLATION, WITH NOTES ON SOME FLUID EXTRACTS.*

BY C. S. HALLBERG, CHICAGO.

The extraction of drugs as practiced in percolation, plays an important part in modern pharmaceutic practice. The favor fluid extracts have met with since their introduction, has been the cause of largely increasing the number of drugs desired in this form, until no doubt before long the official list will embrace nearly all the vegetable remedies.

The investigations of various experimenters, such as Squibb, Lloyd, and Diehl, have greatly advanced our knowledge regarding these preparations since the first processes devised by Procter, or that of Campbell upon which the formulæ in the U. S. P., 1870, were constructed.

It has been shown that extraction is accomplished with less volume inversely in proportion to the height of the column of the drug operated upon, which discovery was of the greatest importance, since it facilitates extraction, with the least amount of menstruum. It has also been demon-

* Read at the Fourth Session.

strated that the process of the U. S. P., 1870, was radically faulty, and that the preparations were prone to precipitation, owing to the admixture of an aqueous extract with the alcoholic reserved percolate.

In the process for fluid extracts in the U. S. P., 1880, this has been to a great extent avoided in that the percolate is evaporated to a soft extract previous to admixture with the reserved percolate, and that subsequently the original alcoholic strength of the fluid extract is restored by the addition of more of the menstruum.

If we do not misunderstand the theory herein involved, we are of the opinion that less danger of precipitation would be incurred, solution more quickly accomplished, and therefore the fluid extract finished with greater expedition, if the extract obtained by concentrating the weaker percolate was dissolved in the original menstruum, previous to admixture with the reserved percolate. In a properly conducted percolation of such drugs as contain a large percentage of extractive, notably rhubarb, taraxacum, etc., the menstruum in the reserved percolate holds suspended or in solution as much soluble matter as it will permanently retain (forming a saturated solution). Upon the addition therefore of more soluble matter, its dissolving power is taxed to its utmost, the alcoholic strength of the whole in addition is slightly reduced, altogether, causes which operate to unfavorably predispose the permanency of the solution. Since it has been noticed that in preparing fluid extracts of some drugs like the above-mentioned, the extract was not dissolved in the reserved percolate until its required volume was reached by the addition of more menstruum, no practical advantage is gained by the procedure in the official process. On the other hand, the extract readily dissolves in the menstruum with which it was originally extracted, and precipitation is avoided in the admixture, when the alcoholic strength of the liquids is the same.

In fractional or re-percolation, the chances for precipitation of the extract are avoided as far as immunity may depend upon retaining the original alcoholic strength of the menstrua. Although precipitation frequently does take place when this method has been used, it is caused by the inability of the menstrua to hold permanently in solution the extracted matter. It has been observed that inert matter of a drug is sometimes extracted along with the active principles, and that a gradual precipitation subsequently results of the more or less indifferent constituents. It has also been found that while such menstrua are undesirable for physical reasons, they are at the same time more effective in dissolving the active principles, and insure a more complete exhaustion, than when menstrua chosen for their capacity of suspending all the extracted matter, are employed. As an illustration serving to prove the correctness of this observation, we may mention fluid extract of ergot. According to the best of authorities, as well as our own experience with the drug, the alcoholic strength of the menstruum for the fluid extract should

not exceed that of 40 per cent., as all the desirable active principles of the drug are soluble therein, whereas the solubility of part of the medicinally valuable constituents is modified in alcohol above this strength. On the other hand, the preparation made with 40 per cent. alcohol will, after a short time, show signs of precipitation, which will continue for a period of about three months. This precipitate will be found to consist of a modified form of the fixed oil, which, having been extracted along with the active matter, is subsequently, owing probably to resinification caused by the watery menstruum, gradually rendered insoluble. When the officinal menstruum is used, as complete extraction is not obtained as by the 40 per cent. alcohol, but the oil, present perhaps in even greater proportion, is scarcely precipitated at all, owing to the greater alcohol strength of the fluid extract. It will thus be seen that while the weaker menstruum is the best solvent for the active principles, it does not answer as well for keeping all the suspended matter permanently in solution. When the precipitated matter be of such character that by its rejectment the preparation is improved, then the best solvent should be used for extraction, irrespective of any subsequent precipitation. Unfortunately, however, owing to our limited knowledge of the chemical constituents of the vast majority of drugs, as well as insufficiently well established therapeutic facts, this course of procedure, while plainly desirable, is in practice inadmissible. In the present instance, the complete exhaustion of the drug is considered of greater importance than transparency in the preparation. Nevertheless, to secure both, elegance as well as efficiency, fluid extract of ergot is made with 40 per cent. alcohol, and the preparation allowed to remain undisturbed until precipitation has ceased, when the clear liquid is decanted and filtered.

In the adoption of repercolation as an alternate process in the U. S. P., '80, the committee on revision were no doubt aware that this method in its present form cannot practically be applied to the extraction of drugs in smaller quantities. This has been the great drawback to its more general employment. Since, however, this method of extraction originated, or we may say, was almost forced upon operators on a large scale, it will be seen that to make it of equal value in small operations is therefore an impossibility, unless modified accordingly. The earliest account of this manner of extraction is noticed in the manufacture of quinine and other alkaloids, where large quantities of drugs are operated upon, and where successive macerations are effected, entailing the use of a vast amount of solvent, and where the reduction in bulk of the liquor so as to be nearly as possible a saturated solution, is a desideratum, the achievement of applying which is regarded from an economic as well as rational standpoint. In applying this process to a small operation in pharmacy, the very feature which renders its employment desirable in operations of greater magnitude still remains, namely, the extended period required for bringing the

process to a close. As this item of time is of as much moment in the practice of pharmacy as in any other art or profession it must be taken in consideration, lest the advantages gained by the employment of the process are more than counterbalanced by the expense attached thereto. As a volume for weight extraction (without entailing subsequent condensation) is the most desirable process for fluid extracts its employment should be universally adopted in small as well as large operations, provided that in its application the time expended is not greater than by the more simple processes. With this end in view a modification of this process is offered, which has been termed, to describe it briefly,

SIMULTANEOUS FRACTIONAL PERCOLATION.

The following is an outline of the process: Divide 100 parts of the drug to be extracted in three or four equal portions. Moisten each portion uniformly with from 20 to 40 per cent. of the menstruum, according to the bulk of the drug and its fineness. Pack each portion separately in a cylindrical percolator according to the general directions for preparing fluid extracts in the U. S. P., '80, and designate each portion respectively Nos. 1, 2, 3, and 4. (When practical, better extraction is accomplished in 4 portions than in 3.) Pour the remaining menstruum gradually upon No. 1 until it begins to drop, when the orifice is closed and left to macerate for 12 or 24 hours.

Percolation is then proceeded with according to the official directions as to rate of speed in dropping, the remaining menstruum being in the meanwhile poured upon the drug, and subsequently so much more of a mixture of the same alcoholic strength, or, perhaps, somewhat lower, as to displace the amount of menstruum originally used on portion No. 1. The percolate is reserved in portions of from 20 to 40 per cent. of the amount of drug in No. 1, according to the proportion required to moisten it with. Thus, for example, of cubeb, ergot or ginger, and drugs of a similar density, it has been found that 20 per cent. of menstruum is sufficient to moisten with, and the amount of percolate reserved, therefore, from this class would be 20 per cent. of one-fourth of the original 100 parts taken, namely 5 parts, volume for weight.

In a class of drugs which are twice as bulky as those just mentioned we find arnica, buchu, senna, and most leaves and flowers. These require 40 per cent. of menstruum for moistening, and the percolates reserved from part No. 1 should, therefore, be of this volume, or twice that of the first-mentioned class, namely 10 parts. Intermediate between these two classes, we find a smaller number of drugs, mostly barks, such as cascara sagrada, and a few rhizomes, i. e., glycyrrhiza and sarsaparilla. But this exceptional class is quite limited in numbers, and by far the largest portion of the drugs belong to either of the two extremes above noticed, which may be represented as being of a volume 1.50 and 3.00 compared to water at 1.00. Thus, practically, one pound of podophyl-

lum, nux vomica, or ergot, will occupy the same space as one and a half pints of water, while one pound of arnica, buchu, or senna, fill a volume equivalent to three pints of water. These proportions of volume in crude drugs are, of course, only approximate, and they are influenced more or less by the degree of fineness of the powder, and probably other causes inherent to their physical condition.

It is believed that sufficient attention has not been paid to the volume of crude drugs, as, with a better understanding of this relation, extraction is greatly simplified. Observation has led to the belief that the soluble constituents of a drug remain, to a great extent, constant in the first portion of menstruum used; that the extract is kept in solution, and not influenced by gravity. If proper menstruum are chosen, the extract is kept permanently in solution in the finished preparation; why, then, should gravity cause it to descend during the process of extraction? That the pressure of the superior liquid, and the hydrostatic force where the drug occupies a high column are the only agents to be taken into consideration in the process of displacement, is easily believed. Upon this theory, therefore, it is sought to reserve each successive portion of solvent in contact with the whole column of the drug as it is displaced by the remainder of the menstruum.

Consequently, each volume of percolate, representing the portion used in moistening, is kept separate until the whole amount of the menstruum originally used is obtained. So far, apparently, nothing has been gained in circumventing the tedious and time-consuming process of fractional percolation, may be said! *Everything* has been gained—time.

While the extraction is being accomplished in No. 1, maceration is proceeding in the other parts, Nos. 2, 3, and 4. The first percolate from No. 1 is reserved, while the succeeding portions of 5 parts each are successively poured upon No. 2.

Percolation may be at once proceeded with, as soon as sufficient parts have been obtained to keep the surface of the drugs in the percolator covered, maceration having been already effected. The first 5 parts of percolate from No. 2 are added to the reserved 5 parts from No. 1, and the successive portions obtained poured upon No. 3, from which the first 5 parts obtained are added to those of Nos. 1 and 2. Percolation is proceeded with in No. 3 in the same manner as in the former numbers, alcohol of the same strength of the menstruum being used for displacement. As will be seen, 85 parts of the original menstruum now remain for the extraction of No. 4, containing 25 parts of the drug. If the process so far has been carefully conducted, the complete exhaustion of the drug with such a large portion of menstruum is readily accomplished.

In a record of extractions by this method, kept for one year, it has been found that exhaustion is better effected by stronger alcoholic menstrua; that in drugs whose constituents are more soluble in stronger alco-

hol (80 to 94 per cent.) than in those where diluted alcohol or still weaker menstrua, containing glycerin, are indicated. It is not claimed that for this reason stronger alcoholic menstrua should be indiscriminately employed, but to call attention to the fact that resinous drugs, such as *cimicifuga*, *podophyllum*, etc., are more easily exhausted, volume for weight, than drugs containing more extractive soluble in water upon which the medicinal value depends, and for which, therefore, weaker alcoholic menstrua are directed to be used. By determining the percentage of extractive in the various percolates obtained during the progress of percolation, it was thought that possibly an estimate could be made of the rate of extraction in the different parts. While the percentage of extractive matter obtained from a few drugs such as *glycyrrhiza*, *rhubarb*, etc., may be a fair basis upon which to judge of the relative strength of the percolate to the crude drug, it is considered doubtful whether or not in the larger portion of drugs the comparative strength of a percolate can be determined by such a purely pharmaceutical method.

In continuing the percolation with alcohol of the same strength as the original menstruum after the required volume of fluidextract had been obtained, the percentages of extractive matter contained in the weak percolates have been found to represent from 5 to 10, and in exceptional cases nearly twenty per cent. of the drug. Upon examination, however, these extractives were mostly devoid of medicinal value, and, therefore, did not represent the amount of crude drug which their percentage relation to the same had indicated. The following extraction will serve as an illustration of this:

One hundred parts of aconite were extracted by simultaneous fractional percolation. After 100 parts by volume had been obtained and reserved as nearly fluid extract, the extraction was continued with the same menstruum until practically complete exhaustion, which was effected with the use of 100 parts of solvent. The percentage of extractive was determined in each successive 20 portions as follows:

No. 1 percolate, 5 per cent.

No. 2 percolate, 4 per cent.

No. 3 percolate, 3 per cent.

No. 4 percolate, 2 per cent.

No. 5 percolate, 2 per cent.

As will be seen, this is an average of 3 per cent. of extractive, representing nearly 25 per cent. of the drug. This large proportion is to some extent accounted for by the fact that 90 per cent. alcohol was used for the last extraction, while the original official menstruum was 94 per cent. alcohol.

Upon examination, these various portions of extractives proved to be medicinally nearly inert. None responded to the physical test for aconite, so prominent in even the poorest of specimens of aconite root.

Solutions of these extracts, in acidulated water, titrated with *iodohydrargyrate of potassium*, showed the presence of alkaloids, but in such small proportions as to have no pharmaceutical significance.

In conclusion, therefore, it is believed that in the process here presented, with the use of effective menstrua, extraction may be accomplished with the best of pharmaceutical results, and within a reasonable period of time.

A STUDY OF PERCOLATION.*

A paper presented to the American Pharmaceutical Association at its meeting in 1882,
by Nathan Rosenwasser, of Cleveland, Ohio.

REVIEW AND CRITIQUE.

BY H. T. CUMMINGS, M. D., PORTLAND, ME.

During the forty-six years that percolation has been before the pharmaceutical public of the United States, its literature has become somewhat voluminous. Since its first presentation by Mr. Duhamel, in April, 1838, to the American pharmaceutical public, the labors of men like Procter, Parrish, Grahame, Squibb, Diehl, Lloyd, and a host of others less conspicuous, have thrown a flood of light upon its theory and practice, and the conditions and circumstances which more immediately affect its successful execution. A recent addition to this literature is the paper whose title we have placed at the head of the present writing, and which it is our object to examine.

A general view of the paper shows it to be an abstract discussion of the theme, devoid of fact as tested by experiment by the author or others—especially as regards statements considered as new. The first part bears a striking resemblance to the train of thought followed in Prof. Lloyd's paper in the Proceedings of 1879. The author has extended the discussion of solution in a manner to bring to mind a couplet from Dr. Holmes:

“Strains, that diluted to the twentieth part,
In yon grave temple might have filled an hour.”

The paper appears to be susceptible of division into seven parts, which are, however, not very distinctly marked, and which may be enumerated as follows:

1. The exordium, sufficiently declamatory and rhetorical.
2. A tedious discussion of solution and filtration.
3. Percolation discussed.
4. A criticism of the Ph. U. S., 1870.

* Read at the Fourth Session.

5. Methods of percolation discussed.
6. Rosenwasser's Percolator described.
7. Conclusion or peroration, which he calls a Prospectus.

We shall not undertake a criticism of the first division, though it presents some curious features, as "Science and art go hand in hand," "Science is the art of simplicity," "Simplicity is the truest guide to science," giving us a curious three-fold view of science, which, in our simplicity, we have come to regard as an extensive knowledge of facts in nature and the power of co-ordinating them.

He fails to define solution, and his confusion of ideas upon this subject is manifested in his catalogue of *methods* of solution. When we are directed to dissolve a certain substance in a given menstruum, by any authority whatever, we can comply no further than to bring the substance and menstruum into contact, and leave the molecular forces of the two to do the rest. This is the only *method* of solution, whatever may be the substances brought together. *Comminution* increases the amount of surface of the solvendum* in contact with the menstruum. *Maceration* prolongs the contact for a longer or shorter period. *Stirring* or *agitation* brings new portions of the menstruum into contact with the solvendum. *Temperature* is effective in so far as it promotes or retards the molecular action according to its degree. *Gravitation* is most effective where the solvendum is in the upper part of the menstruum, and so favors its action; but none of these can be correctly termed *methods* of solution, however necessary or even indispensable they may be for its successful performance. Solution is merely the result of molecular action, as is evident from the entire disappearance of visible particles in a perfect solution, however highly colored it may be by what is dissolved in the menstruum.

The author rather astonishes us in his discussion of vessel No. 4, wherein he informs us that upon dividing his typical cube into 16 smaller cubes(?), the surface is increased in the ratio of 1 to 256. Oh, Mr. Rosenwasser, what were you thinking of? If you had read Prof. Lloyd's paper with a little more attention, you would have learned that a binary division in three dimensions would produce 8 cubes, and that the surface would be doubled. If this operation were repeated upon the 8 secondary cubes, the result would be 64 cubes, and the surface doubled again, thus increasing the surface of the primary cube 4 times.† And if you had used your slate and pencil, and constructed your figures and calculated the dimensions, you would have found the 6 square inches of your primary cube increased to 16—that is in the ratio of 3 to 8. And we must take Prof. Lloyd to task for surprising us with an equally extraordinary calculation of contacts, to realize which, in our way of viewing it, would

* See page 409. (1).

† See page 409. (2).

require a percolator 25 miles long and one-sixteenth of an inch in diameter!

The author lays down four canons on the subject of solution, to which, so far as we are able to perceive or comprehend them, there is nothing to object, except in canon *b*, to which we believe there will be found numerous exceptions.

In discussing temperature, as a factor in solution, he employs *limpidity* and *mobility* as synonymous, but they do not mean the same thing by any means. Another awkward expression is the following: "The reduction in temperature produces, in some instances, a *return to the solid part of the solution*."

He next attacks the subject of filtering, or, as he puts it, filtration. By way of introduction to this subject, we are treated to the following inscrutable paragraph: "The uses to which solutions are put are either for the purpose of obtaining one or more of its compound parts in a liquid state. *When the object is only to use the solid part in solution*, we can select any solvent, and the one best suited to our wants will be the one to be preferred. *When the object is to use the solution AS SUCH*, we have no choice in our solvent." Exactly, Mr. R., and this is the way you have of leaving us at sea all through your paper.

"In filtration we use an insoluble, cohering substance"—*porous medium* would have been a happier expression—there is not much cohesion in sand, pounded glass, animal charcoal, all of which have been used to a considerable extent as filtering media. Three modes of filtration are specified: simple filtration, expression, and percolation. As to considering expression as a mode of filtration, we think it would require considerable poetic license to see it in that light, unless a straining-cloth were wrapped round the substance expressed, which does not always happen. The result, too, is not always satisfactory, in a majority of cases, requiring a subsequent simple filtering.

After this long preliminary discourse the author arrives at his main subject—percolation. Let us endeavor to gather his ideas as to what percolation *is*, from his comments upon it and the canons he has laid down.

1. The great object of percolation is solution.
2. Percolation is a mode of obtaining solutions of wholly or partially soluble substances.
3. It combines the advantage of maceration, comminution and gravitation.
4. It is *not* a simple process of displacement.
5. The peculiar characteristic of percolation is osmosis.
6. There is a difference between displacement, percolation and cell percolation.
7. It should be practically a succession of macerations proceeding downwards [whatever that may mean—*Reviewer*], and either be slow

and continuous, or interrupted for short periods, and then admitting of greater rapidity of flow.

The first three of these specifications we accept without demur. The fourth, fifth, and sixth do not receive our concurrence, and we proceed to consider them. Mr. R. seems to lay such stress upon osmosis as an important factor in the matter of exhausting vegetable drugs of their soluble constituents, that the Association will pardon us if we detain its attention for a few minutes, while we endeavor to give some idea as to what it really is.

For the knowledge of this phenomenon in natural physics we are indebted to Becquerel, an eminent French physicist and chemist, who was born in 1788. His researches were carried on for several years, and resulted in the discoveries upon which the process of dialysis is based. They are detailed at considerable length in Gmelins' Handbook of Inorganic Chemistry, edited by Dr. Kraut, 6th Edition, Vol. I., Part 1, pp. 714 to 721. Time will not permit of their rehearsal here, but we would invite attention to the conclusions to which Becquerel arrived. He explains the observed phenomena by the presence of the following forces: Affinity, capillarity, and electro-capillary action. The action of these forces, singly or in combination, upon two fluids separated by a permeable partition wall, tends to transfer these fluids reciprocally from one side to the other, and this constitutes osmosis. According to the direction of this transfer from the interior to the exterior of a closed cell, or *vice versa*, this is distinguished into endosmosis and exosmosis.

As to what concerns the reciprocal relations of electro-capillary action and endosmosis, Becquerel found, in regard to the conditions under which the one or the other, or both of them occurred:

“1. There must be two liquids, acting chemically on each other, which are separated by a permeable partition wall of organic or inorganic nature.

“2. Electro-capillary currents can only arise if the permeability is not so great that diffusion or filtration takes place, for then crystalline or amorphous precipitates occur by double decomposition.

“3. The permeability must proceed from a capillary action, which is sufficient to bring both liquids into contact, and thereby into chemical activity, from which sufficient development of electricity follows for the origination of an electro-capillary current along the walls of the pores, which is adequate to electro-chemical decomposition. If the pores are so narrow that the whole of the liquid entering can be decomposed electro-chemically, then there is no endosmose and diffusion at all.

“4. If the pores are wider, then the solution remaining undecomposed passes through and is diffused on the other side. This passage through is favored by the mechanically transferring operation of the electro-chemically created current.

“5. In organized bodies the conditions for the creation of electro-

capillary currents appear to be fulfilled, for no decompositions induced by diffusion have been observed.

“6. The intensity of the electro-capillary current depends on the chemical attraction of the liquids, and upon the size of the pores, whose diameter must be such that the electricity developed by the contact of the liquids shall be employed for the formation of the currents. The liquids must be conductors of electricity, and the partition wall must be neither physically nor chemically altered by them” (*Op. cit.*, p. 720).

These statements serve to make clear the nature of the forces engaged in the solution of all substances, particularly the contents of vegetable cells which are inclosed within their natural partition walls. They would be more distinctly emphasized if we had time to detail some of Becquerel's experiments. But how osmosis deprives percolation of its title to be regarded as a “process of displacement,” we fail to see. If the contents of a cell are wholly or partially removed from its interior to the outside by the action of any solvent, however applied, will Mr. Rosenwasser inform us what *does* happen to them if they are not displaced? And when they arrive at the outside, then they become amenable to what he calls “displacement percolation,” and are still further displaced. *Quod erat demonstrandum!*

Furthermore, Mr. R., argues that “if percolation is recognized as the process of displacement, we must expect to be able to *displace the whole* of the dissolved matter, and *do* in the case of such solids as sugar, salt, etc. Yet in cell percolation we can *never arrive at such a result.*” This appears to us as a clear case of *non sequitur*—because the *whole* is not displaced, therefore the process is not one of displacement. And we deny the correctness of the assumption in the latter sentence. We suspect that the reasoning which follows in the remainder of the paragraph, from which we have just quoted, is a part of the paper in which he “had the honor of calling attention by theoretical demonstration to the impossibility of exhausting drugs of cellular structure,” a paper for which we have vainly sought. We regard this as mere *theory*, and as contradicted by the experience of Dr. Squibb, who, more than twenty years ago, when alcohol reached at a bound a price four or five times greater than it commanded in *ante-bellum* times, argued against percolation being carried to practical exhaustion on account of the infinitesimal quantity and questionable value of the extract contained in the last and greater portion of the percolate; and the reason of this is made clear by a remark in one of his latest papers, “that *medicinal* exhaustion by percolation is more rapid than *absolute* exhaustion; and the dry extract which measures absolute exhaustion becomes poorer in medicinal efficiency, and richer in inert extractive matter; and this divergence in value is greatest near the end of the process.” Is it possible that this remark can give us a clue to the formation of some precipitates in tinctures and fluid extracts?

The author's assumption seems to us contradicted also by the researches of physicists as to the size of gas molecules, and particularly by one of the experiments of Becquerel. Vegetable cells vary in size from 1-300 to 1-3000 of an inch in diameter, and while there may be cells of all sizes within these limits in the same plant, the average of the greater number is from 1-300 to 1-500. Now, W. Thomson, by coördinating the results in several departments of physics by various distinguished experimenters, has arrived at the probable conclusion that the mean distance between centers of two gas molecules in contact is greater than one-500-millionth of an inch, and less than one-254-millionth of an inch. The gas concerned is not specified, but let us assume for the present that hydrogen is the one meant. Can we estimate the size of a molecule of water? Prof. Alexander Naumann has investigated the proportions of the molecular volumes of different gases, and taking hydrogen as unity, finds the molecular volume of oxygen to be 2.32. Adopting these numbers, then, we have for the molecule of water 3.32, that is H_2 the hydrogen molecule and O the oxygen molecule, 3.32 times the volume of hydrogen, supposing the size of the atoms or molecules to remain unaffected by the enormous condensation from the gaseous to the liquid form, which shrinks the volume to somewhere near one-10-thousandth its original amount. If, now, we divide 381 millions (the number between 254 and 508 millions) by 3.32, we have for the mean distance between centers of two molecules of water in contact, one-115-millionth of an inch. These figures are given, in round numbers. Microscopic in size as may be the vegetable cells, and "impalpable" as may be their contents, they can be penetrated and touched by the molecules of a menstruum, and there is margin enough to allow of the menstruum entering the cell through the pores in its wall, and re-issuing loaded with a molecule of the cell contents; and this may be believed to be continuous, as long as the substance percolated is covered with a column of the menstruum which is renewing a supply of the fresh solvent to the cells below its surface. This may be theory; but it is based upon observed facts, and reasoning from authenticated data, is submitted, of course, under liability to future correction, in part or wholly by men of superior knowledge in this department of science.

The experiment of Becquerel, referred to above, consisted in the employment of two plain, highly-polished glass plates, bound tightly together when laid the one upon the other. The object was to have a layer of the widest possible extent, but only of capillary thickness, and the solutions were a gold solution and a concentrated solution of sodium sulphide. Proper arrangements were made to bring these solutions into contact, and the result was that there was a precipitation of reduced gold between the plates. Red and green colored rings of what is termed the "second order" were formed, and by the help of these it was found that

the thickness of the capillary layer of precipitate was between the 210-thousandth and the 260-thousandth of an inch. Moreover, Becquerel found that when the thickness of the capillary layer was as large as one-25-thousandth of an inch, the molecular action caused the precipitates to exert such a force, that unless the bands first gave way, glass plates of 1-12 of an inch in thickness were fractured. These facts give us reason to believe that though the forces at work by osmosis in vegetable cells may be very much more feeble than those above described, that they are sufficiently active to carry the menstruum in and out until all that is soluble is completely removed. In this connection, we quote what at first sight is a very ambiguous sentence. Our author remarks: "Thus the greatest possible exhaustion that can take place would be that by which the surrounding fluids were fully as dense as the fluid in the cell, for were the fluid within to be less dense, the same forces would be as active in withdrawing from the surrounding fluid this excess *into the cell*." The author must have had in mind a static condition of the menstruum when he wrote this sentence, for in percolation no such stagnation ought to occur, and the menstruum should be in a dynamic or moving condition. The precision with which the author lays down the fractions which are abstracted from the cells, reminds us of the exact programmes of the last judgment, which have been formulated by some of our students of prophecy.

Our author next attacks the subject of solvents, and is as inconclusive as usual, exhibiting, however, a decided leaning in favor of an aqueous menstruum. His dictum on this point is as follows: "One of the tests of merit in conditions of solvent must be the ability to reach the interior of cell fully or nearly as rapidly as to pass round and by them. The menstruum that will be most retarded in its passage will be the one yielding (or preserving) the best abstractive power." So he recommends water as being more "mobile"—what he means by that term it is difficult to understand, but to the average mind that properly would seem to conflict with the expression in the last-quoted sentence, while alcohol and ether seem to us more "mobile" than water, and often prove far more efficient menstrooms, even if, as he theorizes, they do contract the tissue of the cell walls. This we doubt, because if the cell walls are either physically or chemically affected by the menstruum, no osmosis results. We submit that the expansion he ascribes to aqueous menstrooms is due quite as much to the filling of the cells by osmosis, as to the thickening of the cell walls by the absorption of water. Increased heat he regards as of doubtful value as an "abstracting agent," and in this he is right. Prof. Tyndall would instruct him that heat is a "*mode of motion*," and the only way we can consider it as an "abstracting agent," is constructively, in the way Congressmen reckon mileage.

We shall waste no time upon his discussion of the selection of the pow-

der; it is as unsatisfactory as the preceding; but will pass to his attack upon the U. S. Pharmacopœia of 1870, or rather upon its directions for percolation. This part of his paper, we are free to say, excited our indignation. The author seems to have taken his cue from Dr. Squibb's strictures upon the process as ordinarily pursued, but he has out-Heroded Herod himself. He arraigns the work of the Committee on Revision with great severity, and with a clumsy attempt to be funny and "sarkastikal." He hints at a hope that a pharmacist may be allowed to exercise his judgment, and perform a go-as-you-please operation, if he imagines the recommendations of the Committee are impracticable or useless. He slurs the directions as impossible to be obeyed, the powder directed as not to be procured, the cost of the menstruum as more than that of the finished preparation as offered in the market, the time consumed as wasted or worse, and the conscientious pharmacist as barred from the opportunity to utilize his spare time and talent. We regard his whole criticism as a tissue of misrepresentation and exaggeration, and an inconsiderate indictment of the Committee on Revision. The pretended "obstacles thrown in the way of the pharmacist in the process of percolation," which he ascribes apparently to the Committee on Revision, are due to the infinitely varied composition and structure of the vegetable drugs principally concerned in the process. The thoughtful and scientific pharmacists and physicians who composed that Committee did their work with such light as the precepts, principles and practice of fifty years afforded them; and if they were in darkness, it was because the *lumen percolatoris Rosenwasseri* (Greek Rhodohydatos) came twelve years too late to illumine their horizon and bless their eyes with its electric splendor. Mr. R. has doubtless found out ere this that he was too late to enlighten the Committee of 1880, so we must go on in the good old way, perhaps, for ten years longer, when the Committee of 1890 can decide or not on authorizing or recommending the hydraulic percolator.

"In answering the questions," says Mr. R.—but he does not tell us what is to follow upon answering the questions which he enumerates, so we are left without any consequent upon this introductory clause.

"Why this *extreme* fineness of powder in conjunction with maceration for so *long* a time *with the entire menstruum*?" This question, perhaps, he thinks would be too easy to answer, considering the views of percolation which have so long and so generally prevailed, so he tries to give us one a little harder, and inquires, "why the necessity for a uniform powder when there is no uniform flow?" Well, we suppose the committee recognized the supremacy of physical laws, and adapted their work to the material they had in hand, not thinking that "abstracting agents" would do very good percolation work with material so heterogenous in size that large and coarse fragments were mixed with powder fine enough to pass the meshes of a No. 100 sieve. In his discussion of this point he does

not keep close to the question, but seems to drift away to the first formulated query, and goes on talking about the fineness of the powder varying with the closeness of the packing, and the time required for maceration, and rather superciliously informs us that "the proper way to *economize* time for the pharmacist, is not to *waste* it but to *use* it." And then goes on with pouring the percolate in parts, with alternate percolation and maceration reduced to *minutes* (how much would a maceration of a minute amount to?), which he thinks would yield a result infinitely superior, and reduce the quantity of a solvent to a minimum. We think that in theory he is laying out for a large expenditure of time, spite of his caution against wasting it, as well as a good deal of confinement and extra labor. He remarks that "the fact that percolation is usually carried on to an excess of the amount of solution desired, and this solution evaporated to a smaller bulk, as in fluid extracts, indicates the little reliance placed on methods of procedure." With all respect we say it, but we believe it is to Dr. Squibb's strictures that we are indebted for the little reliance placed in the method of percolation as heretofore conducted; but the results obtained by Israel J. Grahame's modification of the process as carried on before he took it in hand, and Prof. Procter's enthusiastic adoption and endorsement of it, gave us no reason for lack of faith therein; and if this modification did not succeed to absolute exhaustion, the medicinal exhaustion was sufficient for all practical purposes.

"Why these high-priced menstrua?" Our author answers that "*water* is not only the cheapest, but alters the medicinal value of the *solution* least, and if practicable, should have been most selected." Here is that dreadful *if*, against which we notice Mr. R. has run more than once. He writes rather carelessly; the menstruum must alter the properties of the *substance* dissolved, or it will have no effect upon the *solution*. He cannot be ignorant that water dissolves many vegetable principles which are undesirable in a vegetable solution, and which contribute to its instability; besides in many cases failing to extract the very constituents which are desired. And what warrant has he for inferring that alcohol and glycerin act upon vegetable principles to their detriment? He seems to find it hard to get by a point without a slap at the Pharmacopœia Committee. He advocates a more aqueous menstruum, and discusses the methods of removing the objections thereto. Two ways he mentions—to lessen the *impact* of the swelling drug—for *impact read pressure*—and to increase the *velocity of the liquid*. This latter seems somewhat absurd when we consider a column of menstruum upon the top of an almost impermeable mass of drug—but what will not hydraulic pressure effect? He seems rather ignorant of one law in mechanics or physics, when he says that "hydrostatic pressure simply increases the perpendicular pressure of the cells upon it," whereas hydrostatic pressure is transmitted in every direction from the point upon which it is applied; and to this fact is due the effectiveness of Mr. Rosenwasser's percolator.

“Why moisten the drug with a large per centum of the menstruum before packing?” Mr. R. answers this question correctly in his first sentence, according to our way of thinking, only he does not quite elucidate the rationale of this proceeding. This was a part of Prof. Graham’s improvement, and a very important part of it; and he explained its object to be to displace the air as much as possible from the interstices of the powder, and to promote the action of capillarity, and solicit, as it were, the progress of the menstruum downwards through the closely packed powder. The amount varies, of course, with the drug, which is under treatment. Mr. R. admits the advisability of using a quantity of solvent to moisten the drug, and cause the even flow of the liquid; but where he would draw the line he don’t seem to know himself.

“Why the drug should be packed evenly or uniformly?” Well, we don’t know—we can’t undertake to prove a truism. Mr. R. seems to think it can’t be done, so there is no more to be said, and it was of no use asking the question. If we encounter the force of gravitation, and are beaten, who shall blame us for our ill success? We pass that.

“What is to become of the alcohol left in the drug?” In answer to this question, we remark, first, that the Pharmacopœia of the United States was made principally in the interest of the retail pharmacist; second, that the retail pharmacists are largely in the majority; third, that retail pharmacists are in the habit of dealing with pounds and their fractions in their operations, instead of with hundredweights; fourth, that the amount of alcohol left even in a pound of percolated powder is too insignificant to be considered, if the process has been successfully conducted; fifth, that all the alcohol employed in a percolation, including that required to make up for what is lost by evaporation, and that retained in the drug, should be reckoned in the estimated cost of the finished preparation, and form the basis of the price—thus the pharmacist would sustain no loss, and would have no need to worry about the alcohol left in the drug. As to undertaking to recover it by distillation, or any other method, the quantity is ordinarily so minute that such an operation would not be remunerative. While writing this paper, Prof. Bedford’s Pharmaceutical Record for July 15 has come to hand, in which a writer describes the employment of water acidulated with some one of the mineral acids for pushing through a residue of menstruum in concluding a percolation, a method which he has practiced with much satisfaction and success. The long discussion in which Mr. R. indulges as to re-percolation and the splitting up of the menstruum, does not appear to us germane to the subject.

We shall not pursue our author through his discussion of methods and expedients in percolation, except to say that his criticisms appear to us, in the main, correct, though tinged here and there by his peculiar theories. He seems to us to contradict Dr. Squibb when he says that “he

fails to receive the benefits of thorough extraction if he does secure thorough solution;" and this, with what immediately follows, appears to us to do injustice to the Doctor's work.

With regard to the hydrostatic percolator, if Mr. Rosenwasser thought the contrivance out for himself, he is entitled to the credit—no matter by whom he may have been anticipated—of having solved a problem which has more than once presented itself to us in our twenty-five years' experience as a pharmacist; and of having done it in an admirably simple and effective manner. If, as Mr. Berry informs us, there is a pressure of 32 pounds on the square inch when the reservoir which contains the menstruum is elevated to the full length of the rubber tube, the percolator and all its parts must needs be strong, for in a percolator of seven inches diameter there is a pressure on the diaphragms in the aggregate of near 1200 pounds, more or less. And as, according to the laws of hydrostatics, pressure upon fluids at any one given point is propagated in all directions equally, when the drug is saturated with the menstruum, every individual cell should feel its influence, and, osmosis or no osmosis, they ought to be most thoroughly squeezed. We confess that we should like to see the work it would do with powdered rhubarb, ipecac, dandelion root, squill, or colombo, with all of which we have encountered difficulty.

In the Canons which Mr. Rosenwasser has laid down on the percolation process, we note the following:

In the Fifth Canon.—"All percolations should be practically a succession of macerations." A maceration, as already stated, implies *time*; but the question is, if a current passes a cell wall, picks up a portion of its soluble contents, and passes on without pause, can that be called maceration? The idea seems to be absurd. Percolation, in our view, keeps the menstruum in motion; maceration keeps it stagnant or quiescent. We suppose, however, that this has reference to his idea of alternate macerations and percolations in accordance with his carefully elaborated theory of strata or layers.

Sixth Canon.—"The periods of maceration at any given point should not exceed the time necessary for the solution of the desired substances, etc." How are we to determine that?

Seventh Canon.—We do not recognize any difference between what Mr. R. calls cell percolation and displacement percolation. The process, in both cases, is precisely the same, varied only by the difference in the composition and structure of the substances.

"In cell percolation, the fineness of the powder must be adjusted to the menstruum." The Pharmacopœial Committee seem to think that the fineness of the powder should be adjusted to the structure of the drug submitted to the process, and the menstruum should be adjusted to that; and we agree with them.

Eighth Canon.—We have the same question to ask in reference to this Canon as to the sixth.

In the Conclusion on Percolation, or, as the author calls it, the Prospectus, he has to deal another slap at the Pharmacopœia, inquiring "why should the guide he so conscientiously accepts be so niggardly in its return of confidence, as to lay down to him the narrow, straight and rugged path to his compensation for the sake of the shadow that accompanies the substance (whatever that may mean.—*Rev.*), instead of pointing out the broader road full of light, guiding him to the goal he is seeking?"

Again: "Why not define fluid extracts and other preparations as definitely as they can be defined, and while willingly showing the pharmacist all processes, leave the road open to his intelligent judgment?" The United States Pharmacopœia was not intended for an International Pharmacopœia, nor an Encyclopædia, nor a Dispensatory; hence a choice must be made somewhere, and in our own private opinion the Pharmacopœia Committee have done their work with admirable judgment and thoroughness, and we are satisfied with it, considering it a model work of its kind, and unsurpassed by any other. As to "defining fluid extracts and other preparations as definitely as they can be defined," we don't see how they are to be more "definitely defined" than they are by the formulas and the processes given. We will challenge Mr. Rosenwasser to do it better.

Mr. R. continues: "I will be accused of bringing no examples in practice in support of the views entertained in this paper;" and we doubt whether he ever will be able to do so. Our complaint of him, is that he did not experiment with his percolator, and tabulate experiments and results, after the manner of Dr. Squibb, Prof. Diehl, and Prof. Lloyd, instead of boring us with a long, abstract, theoretical discussion, in which what is true is not new, and what is new is not true, or is at least questionable. We opened to this paper with a great deal of expectation, and finished reading it with a great deal of disappointment; and it is this feeling which has tinged the previous pages of this review.

(1) In discussing the subject of Solution, circumlocution may be avoided by the use of the following terms:

Solvendum.—The substance which is to be dissolved.

Menstruum.—A term already in use—the solvent.

Solutum.—That part of the solvendum, or the whole of it, the molecules of which are distributed among the molecules of the menstruum.

Solution.—The product of the mutual contact of the solvendum and menstruum.

(2) For those who care about pursuing this matter further, the annexed table is offered:

Column A contains the number and section.

Column B shows the sides of the cubes in fractions of an inch.

Column C shows the number of cubes obtained by each successive section.

Column D shows C multiplied by 6 = aggregate number of sides of the cubes.

Column E shows number of sides required to cover a square inch.

Column F shows quotient of D divided by E = number of square inches.

Column G shows quotient of F divided by 6 = number of times the surface of the original cube is increased.

A	B	C	D	E	F	G
0	1	1	6	1	6	0
1	$\frac{1}{2}$	8	48	4	12	2
2	$\frac{1}{4}$	64	384	16	24	4
3	$\frac{1}{8}$	512	3,072	64	48	8
4	$\frac{1}{16}$	4,096	24,576	256	96	16
5	$\frac{1}{32}$	32,768	196,608	1,024	192	32
6	$\frac{1}{64}$	262,144	1,572,864	4,096	384	64
7	$\frac{1}{128}$	2,097,152	12,582,912	16,384	768	128
8	$\frac{1}{256}$	16,777,216	100,663,296	65,536	1,536	256

PRECIPITATES IN FLUID EXTRACTS.*

J. U. LLOYD.†

In our last paper we were led to bring forward an experiment, wherein by evaporating a solution of a mixture of the salts, chloride of sodium and chloride of ammonium, a separation of these substances was effected—one (chloride of sodium) being deposited near the bottom of the evaporating dish; the other (chloride of ammonium) being mostly deposited at the surface of the liquid, or even above the surface line, by the familiar creeping process. The examination of these deposits demonstrated

**Query*.—"Is there any method whereby a solvent can be perfectly freed from a substance in solution, without evaporating the liquid, precipitating the dissolved matter in an insoluble form, or changing the liquid (as adding alcohol to water)?"

This question was addressed to several of our foremost scientists, and without any information being furnished as to another known method. In connection with this subject, it is proper to state that for many years it has been known that charcoal will separate certain organic matters from solution, and, according to the experiments of Mr. Witt (1856), it was shown that 22 per cent. of chloride of sodium was taken from a solution of that substance by filtration through $1\frac{3}{4}$ feet of sand. These facts are related to the experiments which follow, and to which we can find none similar on record. Indeed, quotations from our acknowledged authorities show that the phenomenon herein brought forward has been generally overlooked. We will cite as follows:

FILTRATION.—"The mechanical separation of a liquid from the undissolved particles floating in it."—*Ure*.

"The separation of suspended matter is effected on the small scale for laboratory purposes by filtration through porous paper."—*Roscoe & Schorlemmer*.

"The mechanical separation of fluid from solid matters mixed with them. The pores of the paper permit the fluid to pass through, whilst the solid matter, being prevented, remains behind."—*Galloway*.

† Read at the Fifth Session.

that the lower part of the lowest deposit was more than half chloride of sodium, while the upper deposit contained but two-thirds of one per cent. of chloride of sodium. The question that presents itself is, can solutions of salts separate from each other after being mixed? In continuing this subject, we shall confine ourselves to a phase closely connected with the foregoing experiment. The experiments tabulated herein were made more than a year ago. If we had written this paper before passing to other experiments, doubtless we should have permitted ourselves to theorize more freely regarding the phenomenon than we care to do at present. As it is, we shall present the experiments, and endeavor to reserve our opinions concerning them for a future day.

It may strike some persons that the present paper is entirely irrelevant to the subject of percolation and precipitation, but, if we are permitted to complete this subject, we think that it will be shown that it is intimately connected with certain features that have considerably troubled pharmacists and others.

An unanswered query, once accepted by one of our most prominent members, is directly interested, and the phenomenon presented herein must be considered before that query can be satisfactorily answered.

A process of percolation suggested once, in which the menstruum was directed to be admitted at the bottom of the percolator, and permitted to escape at the top, is also concerned.

Perhaps the analytical chemist will find some food for consideration, as it does not seem unreasonable to suppose that the principle involved in this paper may be of practical value in the separation of certain bodies one from another. Then, too, it may be found advisable to forego the process of filtration, if possible, where accurate results are desired. However, after we have introduced the line of experiments, and the details into which we have been drawn, these features will readily present themselves to those interested.

Let us now revert to the separation of the two salts by the evaporation of the water. The explanation that naturally presents itself is, that their separation resulted from the fact that the chloride of sodium crystallized, and left a mother liquor of chloride of ammonium. This afterward evaporated; and thus the salts were deposited in different locations. In order to test the correctness of the view we were led to several series of experiments; and a section of one of these may be illustrated as follows:*

Take an ordinary porous blotting-paper, and drop into its centre, drop after drop, some writing fluid. The spot will spread, but it will not present the same appearance from the centre outward. There is usually a

* We only give enough of the series to demonstrate the one feature to which this paper is devoted. Our investigations have extended far beyond the line drawn by this report, but we do not care to impose upon the Society by introducing another step, as it would double the length of the paper.

dark centre, and then a dark line of demarkation, after which another shade appears, which, after spreading to a certain distance, will perhaps suddenly give place to a nearly colorless liquid. Continue to add the fluid slowly to the centre of the blot, and the shades of color will expand and preserve their individuality, but the outer will usually grow more rapidly than the one immediately within. Sometimes several shades will be formed, but their individual characteristics will be maintained. If the ink be one of the purple or other colors of aniline, or a carmine, it will be generally found that the outer liquid will be colorless. The striking feature is the abrupt change from one shade to the other. It is not a gradual grading off, for a distinct line of demarkation usually separates each shade. We have introduced this experiment because it can be so readily performed, and because, upon second thought, every person must even now admit its familiarity. Mix two colors of ink, say red and blue, and try the experiment again. Very likely it will be observed that, under the same conditions, one color will leave the other after both have passed together for a certain distance, and leave it completely, and by a distinct line of demarkation. Then perhaps this second color will cease to spread, and a colorless liquid will pass out, and form a ring encircling the ink spot. (Fig. 58.)

FIG. 58.

These experiments may be easily made, and will illustrate the phenomenon; but since there are so many kinds of ink, it is impossible to predict a certain result. Therefore, to enter into the subject more systematically, we will bring forward the following experiment, in order to illustrate a natural phenomenon that we have not been able to find recorded in any work, and upon which those we have consulted can furnish us no information:

Dilute one part, by measure, of officinal solution of tersulphate of iron with thirty-two parts of water; then place a strip of blotting-paper, of loose texture, so that the lower end is immersed in the liquid. A liquid is absorbed, and passes rapidly into the paper, reaching to a height of about half an inch at once. Then it ceases to extend upward as solution

of tersulphate of iron, but not as a liquid.* A line of demarkation appears as distinct as though drawn by a pencil, and above this line a colorless solution passes; and this liquid is absolutely free from any salt of iron. If a piece of ferrocyanide of potassium be drawn over this paper, it refuses to strike a blue color until the dividing line is struck. Other reagents demonstrate conclusively the absence of even traces of iron above this line. (Fig. 59.) Here we have presented a reaction in which a substance in solution has separated from the solvent, without evaporation of the liquid, apparent precipitation of the solid in insoluble form, or change of solvent power of the liquid.

FIG. 59.



In considering this question from the experiment presented, a doubt must arise in our minds regarding the subject. Is it really a separation of a soluble iron salt from a solvent capable of dissolving it? This query naturally occurs when we notice that the upper edge of the iron solution, as it is absorbed by the paper, has a red color, which deepens as it passes upward, until finally the colorless liquid shoots above it. May it not be that an insoluble basic salt of iron is formed by oxidation of the iron, in the very thin layer of liquid? We thus questioned the matter, and found that the line of division formed as readily and the same in an atmosphere of carbonic acid gas. Again, a piece of paper from just beneath the line—indeed, the very edge of the line of division—when dipped into water, formed a solution that gave a deep blue color with solution of ferrocyanide of potassium.

This experiment, then seemed to show that by means of an agency heretofore unrecognized in this manner, and which seems to be capillary attraction, a separation of solvent from substance dissolved can be effected, and absolutely. In analyzing the phenomenon, we find that there is not a gradual shading off of iron salt from below upward. It might seem natural to view the reaction as an absorption of the iron by the fibers of the paper through which the liquid passed, until finally all the iron disappeared. Upon the contrary, it seems to be a struggling upward of several liquids;† and when the so-called solution reaches a certain height, one part of it is attracted onward with great force, and frees itself from the others. There appears to be an unequal attractive force

* The texture of the paper influences the height to which the solution passes before the separation. The line of separation is soonest formed when the paper is porous. Very firm, compact paper will carry the entire solution to a considerable height. Common Swedish filter paper will answer, but not so well as blotting-paper.

† Solution of tersulphate of iron contains other substances besides the salt of iron. There are free acids, and they are not retained in accordance with the detention of the iron. The indications are also that the coloration of solution of ferric sulphate is due to accompanying oxide or oxysulphate in soluble form, and that true ferric sulphate has no red color.

between the fibers of the paper and the substance passing through them ; there seems to be an unequal and independent capillary attraction between the fibers not moistened and the liquids in contact with them. These forces acting at the same time, cause a separation of solutions at a certain distance from the surface of the liquid ; and after this separation is once effected, the liquid that has freed itself from the other, or others, seems to pass freely through it, or them, apparently drawn from above more rapidly than the other, or others, can follow. Thus, although the lower part of the paper is saturated with mixed solutions,* the liquid that has separated itself seems to flow rapidly through the lower stratum and out of the line of demarkation, without a molecule of the iron salt accompanying it.†

In continuing the study of this phenomenon, we find that the proportion the iron salt bears to the liquid influences the point at which the separation of the iron solution occurs. If the solution is dilute, the separation takes place just above the surface of the liquid in the vessel. As it increases in strength, the iron passes higher upon the paper, and with officinal syrupy solution of tersulphate of iron there will be no separation. (See Fig. 6o.)

This fact leads to another point in connection with the subject, to wit: an attraction seemingly exists between the iron salt and the water, which is stronger in proportion to its concentration. Therefore, as the proportion is in favor of the iron, the water has less power to free itself and climb away.

Can it be, then, that capillary or surface attraction has the power to dissociate a solution ? If so, it seems to us that this fact must have been overlooked in many instances where its consideration was a necessity to accuracy in results.

In looking at the phenomenon as presented in the foregoing portion of our paper, it will be seen that we may sum the matter up as follows :

1st. The bibulous paper absorbs and carries to a certain height the liquid about as it exists in the vessel.

2d. At a point above the surface of the liquid, determined by the texture of the paper and the concentration of the solution, the iron salt ceases to pass upward‡ as rapidly as the water or other substances held in solution by the water.

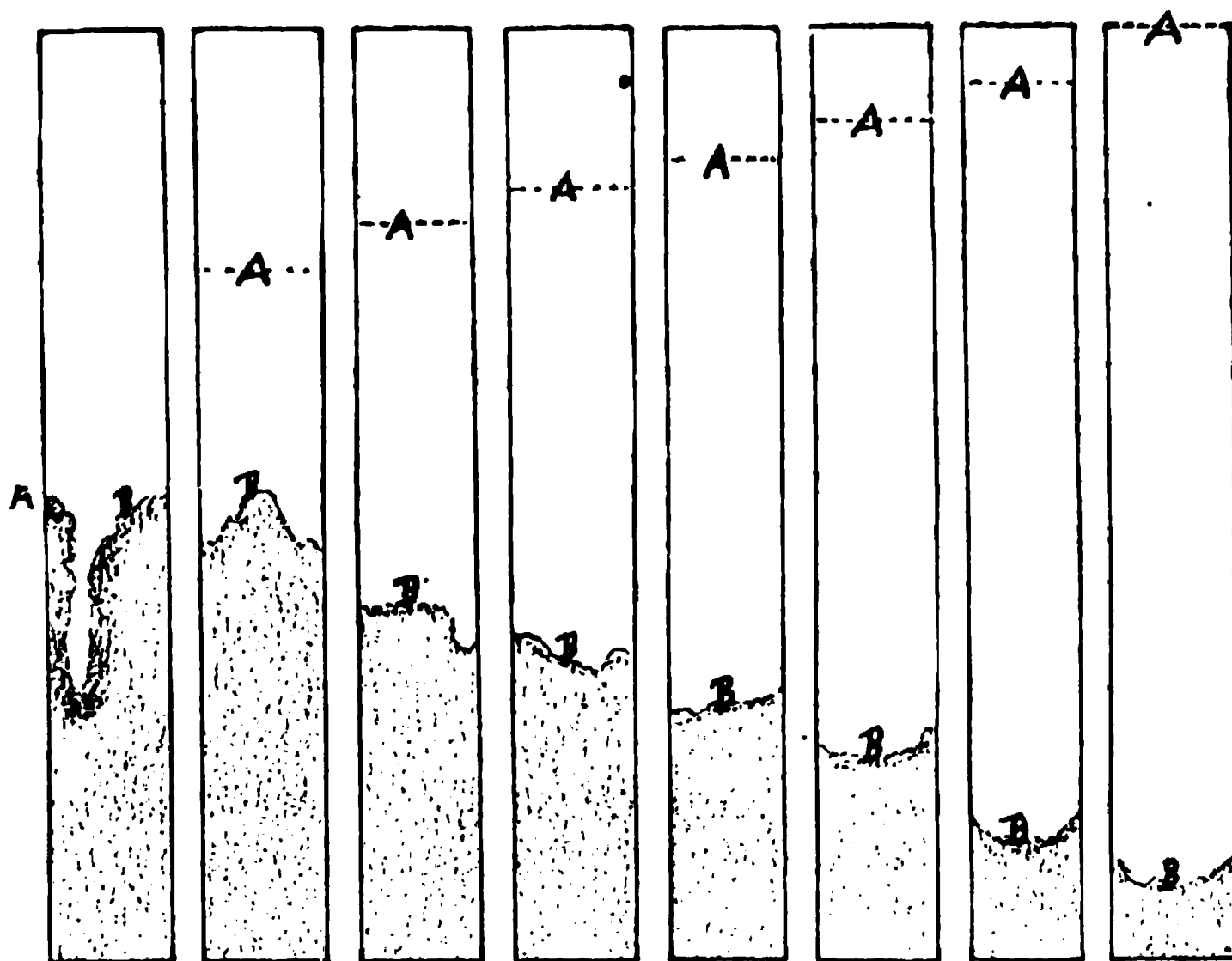
* We admit that the term solutions is not in accordance with our present understanding of a solution of several salts in one menstruum. Authorities do not, we think, view them as distinct liquids mixed together and existing independently of each other, but rather as one solution. For the sake of illustrating these experiments, we shall speak of a solution of different bodies as being an association of separate solutions, each retaining its individuality.

† There is a gradual and uniform upward motion of all the liquids, however, although the lowest stratum in the paper moves slowest.

‡ We use the term upward to correspond with this line of experiments. The same

3d. Then the liquids separate, and the colorless liquid is actually drawn (or thrust) through the solution of iron without carrying a trace of ferric sulphate beyond the line of division.

FIG. 60.



In order to determine the amount of water thus passing through a liquid, we call attention to the following experiment :

A piece of blotting paper was placed with the lower end in a solution of ferric sulphate, made by mixing 1 part of officinal solution of tersulphate of iron with 32 parts of water. The separation occurred as previously described, and, when the watery liquid reached the top of the paper (5 inches), the iron solution had ascended but 2 inches. The paper was then divided at the line of separation and at the surface of the liquid, the iron solution in the lower part was weighed with the paper, and the water and paper in the upper portion weighed. Each part was then dried, and weighed again.

Result.—Water in the part of the paper that contained iron, 7 parts.

Water in the paper above the line to which the iron had ascended, $7\frac{1}{2}$ parts.

In the same way, one part of solution of tersulphate of iron (ferric sulphate) was mixed with sixty-four parts of water, and the portions of paper examined.

Result.—Water in the part of the paper that contained iron, 4 parts.

Water above the line to which the iron ascended, $9\frac{1}{2}$ parts.

phenomenon is presented when the paper is horizontal or inclined, if capillary attraction only carries the liquid outward.

Thus it will be seen that in the first experiment the water that had separated was slightly greater than that remaining with the iron; while, in the second experiment, more than twice as much water escaped as remained with the iron.

We present also an experiment with acetate of lead, as follows:

Five grains of acetate of lead were dissolved in one fluidounce of water. The paper was immersed, and the dividing line ascertained by means of a crystal of iodide of potassium. Upon separating the paper, it was found that:

The water in the part of paper that contained lead amounted to $8\frac{1}{2}$ parts.

Water in the paper above the line to which the lead ascended amounted to $4\frac{1}{2}$ parts.

In the same way, five grains of acetate of lead were dissolved in four fluidounces of water:

The water in the part of the paper that contained lead amounted to $5\frac{1}{2}$ parts.

Water in the paper above the line to which the lead ascended amounted to $13\frac{1}{2}$ parts.

All of these experiments uphold the principle that the weaker the solution the quicker the separation, and the larger the amount of the escaped water.

We have mentioned the fact that mixed colored inks separate from each other under the influence of the capillary attraction of bibulous paper.

FIG. 61. It is demonstrated that certain salts will also do this, and completely. In order to show that they act independently of each other when dissolved in a single solvent, we call attention to the following experiment:

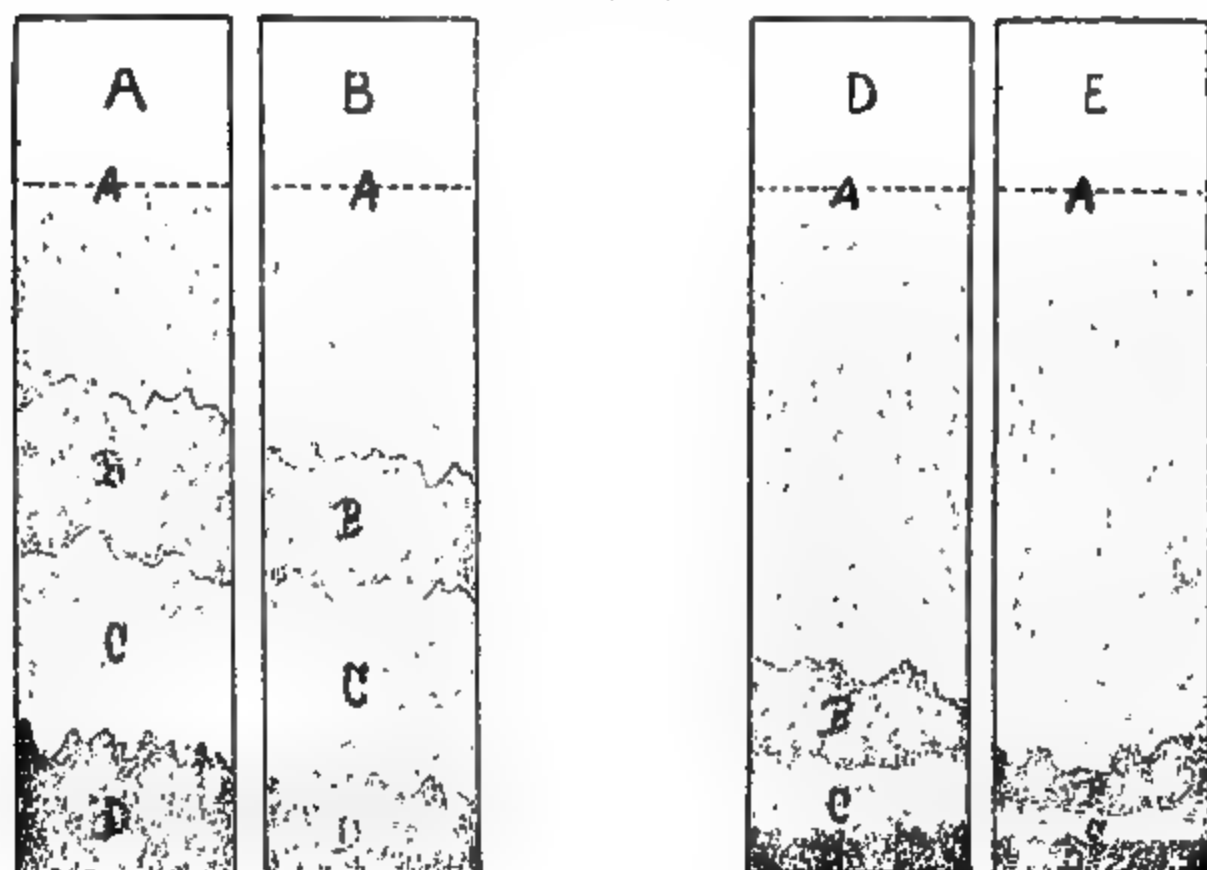
Dissolve five grains of ferrous sulphate in an ounce of water and add one drop of sulphuric acid (to prevent oxidation). Dissolve five grains of cupric sulphate in an ounce of water. Mix thirty minims of officinal solution of tersulphate of iron (ferric sulphate) with an ounce of water. Place a strip of bibulous paper upright in each, and it will be found that at a certain height the metallic solution is retarded. This can be readily shown by drawing a piece of red or yellow prussiate of potash down the paper, for the characteristic coloration will appear as soon as the reagent comes in contact with the salt. However, if it will be found that they separate at different heights in the papers.

Now mix the solutions, and repeat the paper experiment. When the reagents are applied to the paper it will be shown that the ferric sulphate extends only a certain dis-

tance; then a mixture of ferrous sulphate and cupric sulphate; then the ferrous sulphate alone; and finally a colorless solution passes onward, perfectly free from either salt. (Fig. 61.) The boundary line between each salt is clear and sharp.

Upon diluting this mixture with its bulk of water, the rule of the diluted ferric sulphate (Fig. 60) is found to be maintained; and by repeated dilution of each succeeding solution with its bulk of water, a series of regular demarkations are obtained, as shown by Fig. 62.

FIG. 62.



In the same manner, solutions of certain alkaloidal salts can be separated from each other, as, for example, sulphate of quinine and sulphate of berberine, the quinine salt passing onward and leaving the berberine.*

In carrying this series of experiments further, it is readily shown that not only can we separate liquids from each other within the paper, but we can separate them as liquids by acknowledging the fact that a liquid tends to flow from a tube, capillary or otherwise, if the extremity is beneath the surface of the liquid in the container. Two test tubes were placed beside each other, and into one an inch of solution of ferric sulphate (the strength before named) was poured. A strip of blotting paper was then so placed that one end reached into the liquid, while the other end rested below it in the other vial. The paper was curved, so that the

* It is not unreasonable to suppose that advantage may be taken of this principle to separate certain bodies that seem to dissolve and precipitate alike. Indeed, we have used it in the separating uncrystallizable coloring matters from crystals of organic bodies, where simply the close wrapping of two or three layers of blotting paper over the moist magma will remove the coloring material as the mass dries out.

height was four inches; therefore the liquid traversed eight inches. The exposed part of the paper was covered by means of a sheet of rubber, in order to retard evaporation. (See Fig. 63.)

FIG. 63.

In twenty hours a layer of colorless liquid was carried into the empty vial; and this liquid refused to show a trace of iron by the usual reagents.

Therefore, to sum up from the view presented by these experiments—

The solvent can be perfectly separated from dissolved matter by what appears to be simply capillary attraction.

We must not, however, infer that this is evidence that such a rule will be carried out with other bodies. Experiments with many salts and other substances agreed, but some refused to separate, chloride of sodium being carried to a height of six feet.

We do not design in this paper to enter into a theoretical argument regarding the causes for the phenomenon herein presented. We aim simply to present the facts, and, in doing so, must consider briefly certain objections that have occurred to us regarding the idea that real solutions can be separated from each other by means of the capillary or surface attraction of materials that have no recognized chemical affinity for either of the constituents. Therefore, as the substances that we have named are all solids, it might perhaps be inferred that the molecules of these solids are held in the minute interstices of the paper, while the more mobile fluid escapes.* Such a view could scarcely be sustained,

*It must be admitted that such a view is not in accordance with our idea of a solution.

because mixtures of *liquids* may be separated from each other—indeed, even though such a mixture is supposed to have combined chemically. Sulphuric acid and water are accepted as having rather an intense affinity, and their union is broken only by a considerable display of energy. The mixture of sulphuric acid and water is as perfectly disintegrated by the bibulous paper as were the other substances named by us. This can be shown by making a dilute solution of sulphuric acid in water, and allowing it to pass up the paper, and then pressing a piece of blue litmus paper upon the surface of the part of the bibulous paper that is moistened. The litmus will change to red for a certain distance, defined by a line of demarkation as distinct as that shown by the iron salt.

The facts, then, to be presented in this paper are, that :

1st. Liquids can be separated from solids held in solution, without evaporating the liquid or precipitating the solid in an insoluble condition.

2d. Liquids can be separated from each other.

3d. Chemical combinations even can be broken without calling upon such recognized dissociating powers as high or low temperature, or the action of reagents.

This dissociating force has been overlooked in many places where, perhaps, it might have been useful. It may have been an unknown factor in leading to discrepancies in delicate analytical work that involved frequent filtration. There are other points of interest that we hope to consider in the future.

EMULSION OF BALSAM COPAIBA WITH TINCTURE OF MURIATE OF IRON.*

BY C. W. PHILLIPS.

R. Balsam copaiba	2 drachms.
Powdered acacia	1 drachm.
Saccharated pepsin	1 scruple.
Tr. muriate of iron	2 drachms.
Water	q. s. to make 2 ounces.

The peculiarity in the above prescription consists in combining the tincture of iron with an acacia emulsion by means of pepsin. Triturate the powdered acacia, balsam copaiba and pepsin together; then add one and a half drachms of water, and triturate until a perfect emulsion is formed; dilute with half an ounce of water, and pour into a two ounce, or perhaps preferably in a three ounce bottle, to allow room for shaking. Dilute the tincture of iron with the remaining water; add to the emul-

* Read at the Fifth Session.

sion, and shake well. A good, thin emulsion is obtained. A sample made some two years ago seems to be in as good condition as ever. A creamy layer separates after standing, but mixes readily on shaking. The above would seem to demonstrate that while tincture of iron and mucilage of acacia may be incompatible, yet in the stomach they would not be so. There certainly can be no objection to adding pepsin to an emulsion, and I believe the above will be found a very useful preparation, and relieve druggists of much embarrassment when physicians prescribe balsam copaiba and tincture of iron together with mucilage of acacia.

PEPSAU.*

BY HENRY BIROTH.

I have here a curiosity, which may be of some interest to you and also valuable to the literature on pepsin. It is an article called *Pepsau*, prepared in 1853 by an old gentleman who lived in the neighborhood of Jamestown, Chautauqua county, N. Y., leading a solitary life, and going by the sobriquet of "Crazy Owen." He had often remarked to people of his vicinity that he had made a discovery for which he claimed rare medicinal virtues, and which would bring him lots of money; but no attention was paid to this, because people generally regarded him as a crank.

After his death, the date of which could not be learned, but which must have occurred soon after he had his product ready for the market, his habitation was visited, when heaps of packages containing this pepsin were found, all sealed, wrapped and packed in dozens; some of it was also found in barrels and in heaps on the floor.

As to the method employed in preparing it nothing was ever learned, since he lived very secluded and shunned society; and the secret, for such he regarded it, died with him.

These few samples, and the above memorandum, were given to me by Mr. F. C. Billerbeck, one of my former clerks, now in business in Chicago. I tested the preparation: it is insoluble in acidulated water; it has no solvent power on albumen, and does not coagulate milk; its age, however, being thirty-one years old, may account for it.

The very characteristic circular surrounding the bottle reads as follows:

PEPSAU:

For the cure of Dyspepsau, Jaundice, Liver Complaint, together with all diseases arising from a disorganization of the Stomach. This, I believe, is the Gastric Juices of the Stomach of the Ox, producing the Gastric Juice required by man to digest his food. Prepared by Eben Owen; by no other, I believe, in this world.

* Read at the Fifth Session.

Directions for Using.—Take a small half teaspoonful, fifteen minutes before eating, in a half gill of cold water. My advice is, to eat light suppers.

Prices for Pepsau, by the gross or more, eighty cents per bottle; retail, one dollar a bottle. This is got up under prayer, and will do good, I believe.

April 16, 1853.

EBEN OWEN.

PREVENTION OF BRITTLINESS IN PLASTERS.*

BY HUGO W. C. MARTIN.

QUERY NO. 26.—*Lead plasters and other plasters of the Pharmacy become hard and brittle by keeping. How can their soft consistence, as when freshly made, be preserved?*

The writer, when accepting the query, hardly expected to meet with so many obstacles which he had to contend with, as he did in trying to solve the problem, and consequently regrets that the results mentioned in this report are still not quite satisfactory to himself. The greatest hindrance in my research was the non-possession of a laboratory, the manipulations therefore being necessarily conducted in a store proper, which was certainly disagreeable, if not detrimental to the health of the assistants sleeping there at night. Aside from this, the odor given off was of such a penetrating and persistent nature that it would remain on the premises for nearly a week after an experiment, often causing remarks by my patrons, such as, “Why, what a funny odor? Cooking your supper? Whew, how dis drug store do smell!” etc. The writer thus has contented himself with trying but to solve the most essential part of Query No. 26, that relating to lead plaster, since lead plaster enters into 12 out of 17 of the officinal ointments. After various trials and experiments on a number of different formulas without any better result than that of the officinal, the writer finally constructed a formula which, if not perfect, at least would seem to be quite an improvement. It is as follows:

Castor oil	Part j.
Olive oil	Parts viij.
Oleic acid.	Parts ij.
Oxide of lead (Litharge)	Parts vj.
Water	Parts xvj. or q. s.

The oxide of lead was first rubbed to a fine powder in a mortar, then mixed with the oleic acid and the oils, and lastly the water, boiling, added to the mixture. This was then boiled for nearly four hours, by continuous stirring and the constant addition of boiling or hot water as it was required. At no time was the water entirely evaporated before

* Read at the Fifth Session.

the product was finished, but, on the contrary, probably had excess of water several times, my object being to guard against a deficiency, and prevent a negative result. The substitution of oleic acid for part of the olive oil would certainly seem to *facilitate* matters, as well as to make a much *whiter* plaster. The addition of castor oil was based on the following: It is generally supposed that lead plaster owes its soft consistence in a great degree to the presence of glycerin. See Nat. Disp., page 564; Drug. Circ., pages 18-81, A. F. W. Neynaber; also Drug. Circ., pages 117-81, Edward S. Sykes. If such is the case, and there does not seem to be any reason for doubt, it is probably due to the mechanical action of the same, as the writer has found by actual experiment that fresh lead plaster, if remelted and subjected to boiling in a quantity of water, is deprived of part of its glycerin, the lead plaster becoming a great deal more brittle. In using castor oil I expected to obtain this same mechanical action, if not a chemical one, in combination with the oleic acid, since we have several acids present in castor oil. As to the chemical action of these acids, the writer does not vouch for it; the mechanical, however, is quite perceptible. Though the plaster made after this formula is not quite up to the standard of the Pharmacopœia test as to its solubility in oil of turpentine, I must say I have come across but very few samples that would not leave some residue or sediment after treating with oil of turpentine. This can no doubt be remedied by the addition of a little more oleic acid to the previous formula, as the residue would indicate unchanged oxide of lead. The sample herewith exhibited has been subjected to the severest cold we have had last winter (away below zero), and again to the warm weather a week ago. It has never changed its color one particle, and apparently has remained the same in consistence during the various climatic changes. It is adhesive, yet not excessively sticky; is quite firm, yet pliable and not brittle; and in appearance would seem to be everything wished for. At our next annual meeting I will endeavor to answer that part of the query pertaining to the balance of the plasters.

A NEW POISON CASE.*

BY HENRY BIROTH.

Scarcely a year passes without some serious accident by poisoning in drug stores of our country, and a large proportion of these sad cases arise from want of systematic precautions, or from absent-mindedness, or haste. Often, indeed, we are unable to account for the occurrence of the mistake, and obliged to explain with due humility: "It is human to

*Read at the Fifth Session.

err;" but while it is impossible to wholly prevent mistakes in dispensing, such cases should surely be reduced to their minimum by every means possible. Not only do these fatal errors carry sore bereavement to the family of the victim, but the reputation and business of the druggist in whose store the error was made are at the same time seriously damaged if not ruined, and the whole profession of pharmacy suffers from the shock to the public confidence.

Every effort made in this direction to prevent these accidents should be considered as an act of humanity and welcomed with gratification, as it relieves the druggist as well as the public of a burden of anxiety, fear and mistrust.

The well-known fact, that a poison-safe is a rare thing to be found in most of our drug stores, and where it is found the least organized, this fact, and a recent case of poisoning occurring in my own city from dispensing morphine in place of quinine, so impressed me, that I took up my former studies over the problem of prevention, determined to find, if possible, some practical means of guarding against the recurrence of such fatal mistakes.

I believe that the Poison Case which I have designed, and to which I now beg to invite your attention, will fulfill the end in view more perfectly than any other which has come to my notice.

This poison case is not intended to hold *all* remedies potent enough to cause alarming results when given in overdoses, for it would clearly defeat the practical value of this safeguard to make it too general. In other words, we could not gain much by moving the greater part of our stock into a separate room or case, to be called a poison closet. My poison case is intended to contain only the most potent narcotics, and more especially those that are frequently used. My aim is to isolate these dangerous substances from all others, and from each other, in such manner that no one who is at all fit to be a pharmacist can possibly commit any mistake between them.

To further increase the efficiency of this safeguard, I recommend that, wherever practicable, dilutions be made of such substances, as for instance: Morphine, strychnine, corrosive sublimate, and arsenious acid. The dry triturations or dilutions which I employ in my own store, and which I have found to be exceedingly convenient, are uniformly prepared so that *eight grains represent one grain* of the active ingredient. The liquid dilutions are solutions of which *one fluidrachm represents one grain* of the active ingredient. Of course, these proportions can be changed according to individual preference, making them decimal if desired, or otherwise; but I regard it as essential that the strength of each dilution should be the same as that of any other of the same class, in order that there may be no error resulting from defective memory.

The doses of the powerful agents of which dilutions should be made

are so small that the corresponding doses of their respective dilutions will be found none too large, and the diluents wholly unobjectionable. It is obvious that if at any time one bottle should be mistaken for another and one of these poisons thus dispensed, the dose given would be greatly reduced, and the danger correspondingly diminished. At the same time, the dilution insures greater precision in weighing, reducing possible deviation from exactness to a minimum.

This poison case is quite compact. In fact I was surprised to find that a case twenty-four inches broad, twenty-seven inches high, and five inches deep, is amply sufficient. It thus occupies so little space that it becomes easy to find an appropriate place for it in the neighborhood of the prescription counter.

It contains ten compartments, as follows :

No. 1. Labeled "*Morphine.*"—This contains an original bottle of morphine (1 ounce), with the manufacturer's label undisturbed, and behind it may be placed several drachm vials of morphine. These bottles are intended for use only when large quantities are called for.

No. 2. Also labeled "*Morphine.*"—This is to contain the dilutions of morphine, viz., in front a six-ounce bottle of solution prepared as above mentioned, each fluidrachm to contain 1 grain of morphine sulphate, the diluent to consist of alcohol and water in the proportion of 1 to 7. The addition of alcohol preserves the solution perfectly. Next to it stands a four-ounce bottle of trituration prepared from one drachm morphine sulphate and seven drachms sugar. Behind these bottles are three shelves. One of them may be used for acetate, valerianate, hydrochlorate and other salts of morphine; another for pills of morphine; and the third for any other or similar preparations.

No. 3. Labeled "*Opium.*"—To contain a four-ounce bottle of powdered opium, and a six-ounce bottle of tincture of opium. Behind these are again three spaces, of which one may be used for denarcotized opium, extract of opium, etc.; another for pills, and the third for whatever other opium preparations may be required.

No. 4. Labeled "*Cyanides.*"—In this compartment is to be kept an original bottle of cyanide of potassium behind; and in front two original one-ounce vials of hydrocyanic acid, one opened and the other in stock.

No. 5. Labeled "*Corrosive Sublimate.*"—Intended to contain an eight-ounce bottle of corrosive sublimate, and an eight-ounce bottle of solution, prepared of the same strength, in the same manner as the morphia solution, *each drachm* containing *one grain* of bichloride of Mercury. Behind these are spaces for proto- and biniodide of mercury, yellow sulphate, etc., and also for pills containing corrosive sublimate, the iodides, or other powerful mercury preparations.

No. 6. Labeled "*Arsenic.*"—This compartment has two doors. It is to contain a two-ounce bottle of trituration prepared of one drachm arseni-

ous acid and seven drachms of sugar, and also an eight-ounce bottle of arsenic kept in a pasteboard box in order to distinguish it from the bottle of trituration, since the contents of both bottles are white powder.

This additional precaution is deemed highly desirable, although the sizes of the bottles are very different, and the labels conspicuous and distinctive. There is also in this compartment a *round* eight-ounce bottle of Fowler's solution, and an oval eight-ounce bottle of Donovan's solution; also a four-ounce bottle of solution of chloride of arsenic, and another four-ounce bottle of solution of arseniate of sodium. These two four-ounce vials are of different shapes. Behind are spaces for a number of small arsenical preparations, such as arseniate of quinine, arseniate of sodium, red and yellow arsenic, etc., and for pills of arsenious acid.

No. 7. Labeled "*Strychnine.*"—This will hold a two-ounce bottle of trituration, prepared from one part strychnine sulphate and seven parts sugar; and also a four-ounce bottle containing a solution of the same strength as the morphine solution; the diluent in this case to be one part alcohol and three parts water. Behind may be placed the small bottles containing the pure alkaloid and its acetate and sulphate, etc.; and also granules containing strychnine.

Compartments 8, 9, and 10 are not labeled. They are intended for miscellaneous poisons, as described below:

No. 8 is to contain a two-ounce bottle of each of the tinctures of aconite, belladonna, and gelsemium, and behind these may be placed small vials of atropine, atropine sulphate, aconitine, apomorphine, etc.; also pills of these.

No. 9 contains two-ounce bottles of the stronger acids, as muriatic, nitric, nitro-muriatic, and sulphuric acid, and also of pure carbolic acid for internal use. Behind may be kept small bottles of triturations of calomel and of tartar emetic, one in a dark bottle and the other in a white one—both prepared from one drachm of the chemical to seven drachms of milk sugar. If considered to be more practicable, these two mixtures may deviate from the rule, and be composed in the proportion of 1 to 3. Milk sugar is to be preferred in these preparations. There may also be kept in this compartment, behind the acids, small bottles containing 25-per-cent. solutions of the extracts of belladonna, hyoscyamus, and opium, prepared from *one ounce* extract, to one ounce each of water, alcohol, and glycerin; these solutions keep perfectly, and are very convenient.

No. 10 may contain two-ounce bottles of the tincture of veratrum viride, wine of opium, and deodorized tincture of opium. Behind these may be placed such articles as digitalin, codeine, hyoscyamine, veratrine and other alkaloids.

The top of the whole case may be utilized for narcotic solid extracts, or for larger stock bottles of tinctures of aconite, opium, etc., or for fluid extracts.

It will be seen that, as far as practicable, I have varied the sizes and styles of the bottles themselves, to increase the chances of protection. The labels are all conspicuous and very full, giving in each case the exact strength of the several dilutions, etc. The fact that the smaller vials of poisons are placed on the little shelves behind the larger bottles, although seemingly inconvenient, is in itself a very effective safeguard, by reason of the necessity of removing the bottle standing in front before the other can be reached. There are no locks and keys to this case, because I believe these to be wholly unnecessary. It is enough to know that there is nothing in the case but poisons. Moreover, I believe that where locks and keys are placed on the doors of poison cases, the doors are generally unlocked, or great inconvenience arises, when the key is mislaid. The doors in this case are readily opened and closed, and fit snugly, so as to remain closed when pushed to. The only compartment which may require lock and key is case No. 1, containing the original bottle of morphine.

In this little case is thus contained all that is of especially dangerous nature in the drug store, and, as arranged, it will unquestionably prove the most effective means yet devised to guard against fatal mistakes in dispensing, giving protection to the public and to the dispensers alike.

CHICAGO, *August, 1884.*

CLEANLINESS IN PHARMACY.*

BY G. G. C. SIMMS.

Cleanliness is said to be next to godliness. This is certainly a very strong expression; but yet it does not fully express the responsibility which the pharmacist should feel in regard to carrying out the sentiment in every-day life. The practice of cleanliness should by every pharmacist be considered a most important and imperative duty.

The utensils of the shop should be kept clean: such as funnels, graduates, mortars and pestles, which, after being used, are frequently put down carelessly, and taken up again and used without a thought of their being unclean. Perhaps an acid, an alkali, or some bitter and poisonous substance is still clinging to them, not perceptible in color, but sufficient in quantity to nauseate a delicate stomach, and to exert unwanted chemical effect upon some other ingredient with which it may have been mingled. It frequently happens that a careless washing of the pill-tile, or mortar, leaves a very perceptible trace of strychnine, capsicum, quinine, or some essential oil behind. Even a careless cleaning of the

* Read at the Fifth Session.

scale-pan may cause the next thing that is weighed in it to be flavored with musk, or some other nauseous drug, which, if detected by the customer, would be most annoying to the dispenser, as it would give good cause for the suspicion of a mistake. It is a too common habit of many pharmacists to wipe with a dirty towel the mortar which they have just washed clean ; and to use vials without examining them to see if they are clean ; the uncleanness of which can only be detected, sometimes, by the sense of smell.

Another source of impurity is a neglect to clean the bottles used for medicated waters and syrups before refilling them. The same may be said in regard to ointment jars. The shelf-bottles labeled aqua pura, aqua font. and aq. dist., should be watched as danger lurks therein. These gallons or half gallon-bottles are filled with spring, hydrant or well water, and with distilled water. Either of the first three hold in solution organic (as well as mineral) substances, which, in a few warm days, will probably undergo a change, generating disgusting, if not poisonous gases and microscopic organisms, which will nauseate the patient, as well as have the effect of, perhaps, decomposing other substances with which they may be mingled, thus defeating the object of the physician to effect a cure. It is to be feared that the thoughtless pharmacist leaves the water-bottle uncleansed for weeks, if not months ; and unreplenished until it is emptied by the demands of his business. What is said in regard to the water-bottle, will apply with equal force to all bottles in which other waters (medicated) and syrups are kept, not excepting lime water, which is prone to spoil on account of the carbonic acid gas of the atmosphere becoming absorbed by it. The careful pharmacist will be particular to clean out frequently all bottles that are used as containers for medicated waters and syrups, and never to mix any of the old preparations with the new. He should be mindful of the adage not to put new wines in old bottles.

He should be equally careful not to dispense soda and other mineral waters contaminated with copper or lead ; nor to use soda syrups that have fermented or are flavored with artificial extracts.

It is hardly necessary to say that the careful pharmacist should keep at hand a strong solution of caustic potash, nitric and sulphuric acid, sand and rough paper, bottle-washers, etc., to enable him to keep his utensils clean.

The careful pharmacist should not fail to be cleanly in his person ; this is of more importance in a financial point of view, than to be cleanly in what he dispenses. The public will not excuse untidiness in person and attire.

MANUFACTURERS' PREPARATIONS ORDERED IN PRESCRIPTIONS.*

BY OTTO A. WALL, M. D., PH. G.

QUERY No. 36.—*To what extent, if at all, is it proper for physicians to specify in their prescriptions the particular make of preparations prescribed by them?*

The question, to what extent a physician is justified in specifying certain preparations in his prescriptions, is one to which widely different answers are apt to be given according to the pecuniary and business interests involved. Many pharmacists take the ground that it is unprofessional for the physician ever to specify a certain manufacturer's pills, fluid extracts, elixirs, etc., while others freely acknowledge his right to do so.

This question is one which can best be answered by looking at it from the physician's stand-point, for if it is to his own and his patient's interest that he should specify, then it is proper for him to do so. The physician's duty to his patient is not comprised merely in the visit, the diagnosis and the written prescription, but it includes also the responsibility for the proper execution of his orders. The physician owes it to his patient to see that he is placed under the best possible conditions for an early restoration to health; to provide proper hygienic surroundings; to regulate his baths, his diet and nursing; and last, not least, to see that the proper medicines are administered at the necessary time.

In other words, the physician must regulate and control every influence that may restore his patient to health, and the neglecting or slighting of any of these things is a sin of omission toward his patient who looks to him for his chance of recovery. Not only is it necessary to do all this for the patient's sake, but it is for the physician's own good that he should attend to all these matters. Success in any pursuit in life depends upon an attention to details, and the physician who pays attention to all the details that may or may not assist in rescuing his patient from threatened death, is more successful than he who contents himself with merely writing a prescription and giving a few general directions, which, from the careless manner in which they are given, do not impress themselves upon the attendant's mind as important, and are neglected to the imminent peril of the patient.

One of the details often overlooked by physicians, to their own and their patient's lasting injury, is the looking after the character of the medicines dispensed on their prescriptions.

We have often heard pharmacists say that it is wrong for the physician

* Read at the Fifth Session.

to direct a patient to go to a certain drugstore or to prescribe a certain preparation, "thus compelling pharmacists to load their shelves with the same preparation, made by different manufacturers."

Let us consider whether this is so very wrong. Many pharmacists speak and write as if they think that it must be taken for granted that every pharmacist is honest and in all regards, ability, education and business tact, equal to every other pharmacist. But is there anything in the profession of pharmacy that compels us to believe this? Do the gentlemen claiming it believe it themselves?

Can they not always point out to the physicians reasons why he should use their own prescription blanks and send his patients to them for their medicines. The fact is, the business of pharmacy is like any other business or calling in life. When we find that even in that presumably noblest of callings, the ministry, there are scoundrels and dishonest, corrupt men, can we expect better in any other calling?

Pharmacy is followed by able, mediocre and incompetent men; by honest indifferent and dishonest men. Nor must it be taken for granted, as seems to be so often implied in articles written for pharmaceutical journals, that all retail pharmacists are honest, and all manufacturing pharmacists dishonest, or that the preparations of the former are invariably better than those of the latter. Nor is the reverse true.

Mankind is the same all the world over, and when there are retail pharmacists who are indifferent to the quality of the goods they dispense, and consider only the price of the goods in determining which they will buy, there will also be manufacturers who will make cheap preparations, and wholesalers who will supply them. The trade adapts itself to the requirements, and the demand regulates the supply.

Every pharmacist knows that preparations are often offered in the market for less than the ingredients of an honestly made preparation would cost. If he buys this preparation is he not guilty of encouraging and abetting dishonesty? Does the plea that he does not know the character of the preparation, but supposes it to be all right as long as he hears no complaint, exonerate him from the charge that he is willfully jeopardizing human life and health for the sake of pecuniary profit? Is he any more honest than one who would substitute cinchonine for quinine, or who would only give half weight or measure of important medicines?

Does not the fact that price-lists quote "commercial red cinchona" at 14 cents prove that such stuff is bought and sold and consumed as red cinchona. And is it not likely that "cheap" goods are made from cheap materials?

Every one knows that there are honest and dishonest pharmacists, honest and dishonest manufacturers, and honest and dishonest goods in the market, and the latter kind are by no means rare.

Could we but believe that every pharmacist was honest and competent,

and that all medicines were equally efficient, there would be no necessity for the physician to specify. When we have a valuable watch which needs repairs, we do not take it for granted that every one who has a sign before his door announcing himself to be a watchmaker is, therefore, to be trusted with our watch; but we will pass a dozen watchmakers and go a long distance to take our watch to one whom we *know* to be a competent watchmaker. We do not take it for granted that all watchmakers are competent to repair our watch, but our action practically implies the contrary, namely, that we consider them incompetent until we know the contrary.

If then, we are so particular about our watch, why should we not be equally particular about our much more valuable selves? When we choose a physician, we try to do so intelligently. We have, or think we have, reasons why we prefer our physician to the great number of other physicians around us; why should we act differently in regard to the pharmacist, and prefer the one who happens to live nearest to us, merely on account of this fact?

Should we not rather, as patients, prefer to send our prescriptions to one whom we *know* to be competent and honest, rather than to those who may be equally honest and able, but about whom we know nothing?

Or, as the patient frequently cannot judge, is it not best to trust our physician to choose for us, when his interests and ours are so intimately interwoven?—for our health and the physician's reputation alike depend on the quality of the medicines dispensed.

Nay, even more, is it not to the honest and competent pharmacist's interest that business probity, and integrity, and professional ability, should be recognized and appreciated? It is plainly the duty of the physician to advise the patient how and where to obtain the best medicines, and he does so generally by using the prescription-blank of the pharmacist whom he prefers. His use of such a blank is clearly a specification of the preparations of that particular pharmacist, and an endorsement of them. It does not seem to occur to those who argue against the physician's right to designate a certain manufacturer's preparations, that he is equally wrong and unprofessional when he uses their blanks. If one is wrong, the other must be the same. In one case it is an endorsement of a wholesale manufacturer—in the other case, of a retail manufacturer; with the advantage in specifying the wholesale manufacturer's goods, that he can obtain them everywhere and anywhere, while the others are obtainable only in one drug store.

We must admit that there is a difference, and often a great difference, between the various preparations sold under the same name; that some are almost worthless, others very active.

The physician may have become accustomed to the use of a certain preparation, say of aconite; he knows what a certain dose of that partic-

ular preparation may reasonably be expected to do, and he does not know what action others may have. They may be weaker or stronger; it does not matter to him. He knows what he is about when he specifies a certain dose of that particular preparation, and it is no imputation of incompetence or dishonesty to any one when he specifies it. He simply tries to go sure and take no chances; and to substitute other preparations is dishonest, when we can obtain the one specified, and it is even a question if it would not be better and more honest to decline to fill the prescription rather than substitute without the consent of the physician or patient.

No matter whether we try to argue that ours is just as good, the physician is entitled to get what he prescribes, and he is not to be blamed if he uses his influence against the pharmacist so substituting, for he who is dishonest in small things cannot be trusted in greater things.

Honesty in all things is the best policy. The retail pharmacist may convince the physicians in his neighborhood that he has the best and purest medicines, in which case the physician will no doubt allow him to use his own preparations. We have known of physicians who specified certain preparations, but had given permission to individual druggists to use their own preparations when the prescriptions were taken to their drug-stores. There is no objection to this. It is rarely the case that the physician specifies except in the case of the more important remedies, or when he is not sure to which drug-store his prescription will be taken. In regard to the majority of ingredients he leaves the choice to the pharmacist's judgment. When he does specify, his wishes should be respected and complied with as far as possible.

To conclude, then, it is the writer's belief, based upon many years' experience, that the physician is derelict in a part of his duty if he does not see to it that his patient obtains proper medicines; and he is equally unmindful of his own best interests.

He should, therefore, specify to the extent that he may *know* that proper remedies are dispensed, either by directing the patient to go to a certain druggist, or by specifying a particular preparation with which he is familiar, and in which he has confidence. And it is certainly wrong for him to show less interest in so important a matter as medicines than he shows in regard to his wearing apparel, his food, or fuel, or any other commodity in regard to which he exercises an intelligent choice.

II. CHEMISTRY.

MICROSCOPICAL EXAMINATION OF FUNGOID DEPOSIT IN ACIDUM PHOSPHORICUM DILUTUM.*

BY SAMUEL G. ADE, CHICAGO.

It has long been observed by pharmacists that in various specimens of dilute phosphoric acid, as usually made, a complex fungoid growth soon makes its appearance, of a somewhat tenacious or mucoid character, diffusible, and of a yellowish-grey color.

I have also noticed a deterioration of the solvent power of the acid, corresponding in direct ratio to the fungoid development of the organized deposit. Owing to want of time, I have been unable to make a quantitative analysis, but have found by practical experience that it does not correspond to the requirements of the Pharmacopœia in solvent power, as further demonstrated by the much larger quantity of acid required to dissolve a given weight of quinine than the ordinary dilute phosphoric acid without deposit. This illustrates practically that the fungus grows at the expense of the acid. A marked difference was observed in its action on litmus. The acid containing the fungus gave a much feebler reaction, while the acid containing no fungous deposit produced a very decided acid reaction.

The specific gravity of (U. S. P.) acid is 1.057, while the sp. gr. of three specimens of acids containing deposit were respectively 1.049, 1.053, and 1.055, all of which seem to indicate a general depreciation of value for pharmaceutical use. This much for preliminary chemical work. Microscopically, the growth was found to consist of a minute net-work of fibrillated tubules, diverging from central nuclei in all directions, like the radii of a circle. These nuclei seem to occupy and give birth to new prolongations; four, five, or more closely aggregate together in small groups, forming new foci of development. Without doubt, these small spherical bodies (the nuclei) constitute the ferment by which the fungus grows and maintains a progressive existence; thus it is enabled, by the fermentative process, to take such nourishment from its surrounding medium as to depreciate the acid value of the preparation.

It is very evident that an article deteriorated, and minus the U. S. P. requirements to the extent here demonstrated, is practically unfit for dispensing, and certainly ought to be abandoned. It is a better way to make the acidum phosphoricum dilutum as per U. S. P., making the acid extemporaneously when needed.

A proper dilution of the full strength U. S. P. preparation, with dis-

* Read at the Third Session.

tilled water, would give us a reliable acid, and exclude the possibility of its formation from chronic fermentative changes of the water used.

In conclusion, would be glad to hear from any member of the association upon this subject, and any information received in addition, on points not mentioned, will be very thankfully accepted.

FIG. 64.

Fungoid Growth in Phosphoric Acid.

The cut illustrates the microscopical appearance of the fungus in question.

ON COMMERCIAL BROMIDE OF POTASSIUM.*

BY PROF. VIRGIL COBLENTZ.

QUERY No. 41.—*Examine the Bromides of Potassium of the Market.*

At the suggestion of the Chairman of Papers and Queries, that samples of the same manufacturer's product should be examined at different intervals of time, samples of six American and two European manufacturers were accordingly obtained in original unbroken packages, in the summer of 1883; and again the same ones in the spring of 1884—this being done in order to ascertain any differences in quality of different lots issued by the same manufacturer during the year. To judge a manufacturer by the examination of a single sample would be unfair, but to examine different lots of his own make *would* exhibit the *uniformity* of his own product. Considering the quality of material that the manufacturers turn out at a time, the two examinations within a year would no more than exhibit the variances of products. Of the two foreign samples—one was German, the other English—both were in cubes. Of the six American, two were granulated. The Pharmacopœia require-

ments being of first importance, are first considered, though afterwards a few unofficinal tests were applied where it might be thought to be of some interest for comparison. The U. S. P., 1870, and Ph. Germ., 1882, tests were also applied secondarily.

Taken in this order of the Pharmacopœia, we have

I. SOLUBILITY.

Soluble 1 part in	1.6 parts of water,	} U. S. P., 1880. at 15° C.
Soluble 1 part in	200 parts of alcohol,	
Soluble 1 part in	1 part of water,	} U. S. P., 1880. boiling point.
Soluble 1 part in	1.6 parts of alcohol,	
Soluble 1 part in	2 parts of water,	} Ph. Germ. 1882.
Soluble 1 part in	200 parts of alcohol,	

The British Ph. states that it is to be readily soluble in water, and less so in spirit, but not giving exact proportions.

The solubility of the samples were taken in distilled water at 212° F., and in alcohol (of 97 per cent. vol.) at 60° F. The solubility in distilled water was taken by adding the powdered salt in small portions at a time to a definite weight of water while boiling in a flask fitted with an inverted condenser, keeping the proportions of water constant; the addition was continued till the salt was in slight excess, when the saturated solution was quickly decanted from the residue, which was then thrown upon a tared and moistened filter, dried and weighed; the insoluble residue deducted from total amount used, gave quantity dissolved. The solubility in alcohol was ascertained by digesting an excess of the finely pulverized salt in 20 cc. of alcohol (97 per cent.) contained in a closely stoppered tube, and after standing some time, during which it was frequently shaken, it was thrown on to a filter moistened with alcohol, and after filtration, a small portion of alcohol was added to force out any adhering solution; the filtrate evaporated to dryness and weighed.

The solubility in alcohol serves to detect only gross impurities to a certain extent, such as carbonates, iodides, free alkalis, etc. The amount of bromide itself dissolved, being about 1 in 200 parts, hence the amount of impurities dissolved by the alcohol, might be roughly calculated from this.

2. ALKALINITY.

“Faintly alkaline—single crystal laid upon moistened red litmus paper, should not at once produce a violet blue stain (absence of more than 1 per cent. of alkali).” (U. S. P., 1880.)

Its aqueous solution does not affect the color of litmus or turmeric.” (U. S. P., 1870.)

“A few pieces placed on moist litmus should not change the color to violet blue.” (Pharm. Ger., 1882).

The British Pharmacopœia mentions nothing in regard to the reaction.

The lime-water test may also be added to this, the carbonates being

detected by the white turbidity occurring upon the addition of a little concentrated solution of the salt to lime water.

Since the lime-water test does not reveal less than 1 per cent., and is sometimes less sensitive when the conditions are not closely followed, and the other tests are indefinite, a volumetric estimation of the alkali was made, viz.: 3 grams of the dried salt having been deprived of water by ignition at a strong heat, were dissolved in about 30 cc. of water in a beaker, solution of litmus added, and then heated to boiling decinormal solution of H_2SO_4 was run into the liquid from a burette, until a slight excess remained after the continuance of the heat to expel the liberated CO_2 , the solution being of a bright red color. The excess of acid is then inversely titrated with standard solution KOH . From the number of cubic centimeters of acid solution, the amount of pure K_2CO_3 contained therein may be calculated, each cc. of the normal acid solution corresponding to .0692 grams of anhydrous K_2CO_3 .

A small per cent. of alkali being present, although a general feature in most all the medicinal bromides, is hardly objectionable from a therapeutic point. It must, however, be remembered that the presence of any will give rise to difficulties from incompatibilities in solutions, such as contain alkaloids, iron salts, etc. In such cases, where the salt is supposed to be alkaline, it is best to be first dissolved, tested with litmus; and, if the reaction be alkaline, neutralized with dilute HCl before adding the alkaloidal salt.

3. BROMATE.

“If dilute H_2SO_4 be dropped upon crushed crystals of the salt, they should not at once assume a yellow color.” (U. S. P., 1880.)

“When its solution in water is mixed with a little chlorine, . . . chloroform agitated with it, on falling to the bottom, exhibits a red color.” (Br. P.)

“If spread in powder form on a porcelain plate, it should not be colored yellow immediately on addition of H_2SO_4 .” (Ph. G., 1882.)

“In aqueous solution, it may also be detected by the liberation of bromine, upon addition of a few drops of H_2SO_4 dil., imparting a yellow color, which, upon subsequent agitation of the solution with a few drops of CS_2 , will be absorbed by the latter.” (Hoffmann and Power Anal.)

The U. S. P. and Ph. Germ., essentially the same, both depend on the immediate coloration of the salt on the addition of H_2SO_4 ; this test is practically a close one when carefully followed. Of course, the presence of this salt should always be avoided by the manufacturers, and, when present, it is there from carelessness or neglect of proper precautions in manufacture. Since the bromate is well known to be poisonous, though reducing agents do not liberate the free bromine as readily as iodine from the corresponding iodate, still, as potassium bromide is generally given in much larger doses than the iodide, the presence of the bromate in but little more than traces would render its administration inadmissible.

4. IODIDE.

If 1 gram of salt be dissolved in 10 cc. of water, some gelatinized starch added, then a few drops of chlorine water be carefully poured on top, no blue zone should make its appearance at the line of contact of the two liquids." (U. S. P., 1880.)

"A solution of the salt mixed with mucilage of starch and a drop of an aqueous sol. of bromine or chlorine, does not exhibit any blue color." (B. P.)

"A solution of 1 gram of salt in 100 cc. of water should not, after the addition of a few drops of Fe_2Cl_6 , impart a violet color to chloroform." (Ph. Germ., 1882.)

Bonis recommends adding a few drops of Fe_2Cl_6 to a test tube containing sol. of KBr , and heating to a gentle ebullition, when the iodine is precipitated, while the bromine remains intact. This makes a very delicate test, even for traces. In performing the U. S. P. test, care should be taken, in adding the chlorine water, not to add too much of an excess at once, since, in the presence of the iodine, the excess of free bromine liberated may in every case mask the reaction. Advantage of this reaction has been made use of in the separation of iodine from bromide of potassium. The contaminated salt is dissolved in water, and then bromine water is added in small portions at a time to the solution, heated to boiling, until it is present in excess. The solution is then evaporated to dryness, thus driving off the iodine. Iodine, though not often an impurity in bromine at present, still might occasionally occur in poor samples, and in this way enter as an iodide in the manufacture. An intentional adulteration with the iodide in any quantity is not probable, considering the difference in the market value, although, some years ago, the presence of iodides in bromide was of frequent occurrence in the English market—probably added for the reason that the bromide, when containing any iodide, crystallizes in much larger crystals, also enhancing the beauty and appearance of the salt.

5. SULPHATES (LIMIT).

"On adding to 1 gram of salt, dissolved in 20 cc. of water, 5 or 6 drops of test solution of BaNO_3 , no immediate cloudiness or precipitate should make its appearance" (U. S. P., 1880).

"20 grams of solution (1 to 20) to which 4 drops of BaNO_3 solution have been added, should not become cloudy" (Ph. Germ., 1882).

Should the salt be very alkaline, a drop or so of HCl should be added.

6. CHLORIDES.

"If 3 grams of well dried salt be dissolved in distilled water to make 100 cc., and 10 cc. of this solution be treated with a few drops of test sol. of $\text{K}_2\text{Cr}_2\text{O}_7$, and then volumetric sol. of AgNO_3 be added, not more than 25.7 cc., of the latter should be consumed before the red color ceases to

disappear on stirring (absence of more than 3 per cent. chloride)" (U. S. P., 1880).

"When distilled with a mixture of bichromate of potash and sulphuric acid it yields a red liquid (distillate) which is decolorized on the addition of aq. ammonia in excess, but in no case must turn yellow, which would indicate the presence of chlorine" (Ph. Germ., 1870).

The test of 1870 depends on the formation of chlorochromic anhydride, while the process of 1880 is that in main part first recommended by Baudrimont, the presence of iodides, carbonates, sulphates and nitrates, in any quantity, rendering the test useless.

An excellent and convenient qualitative test that might do well to apply to a suspected salt before attempting the quantitative, is given by Hager, depending on the fact that bromide of silver is but sparingly soluble in cold dilute solution of ammoniac carbonate, while the chloride is freely soluble. A portion of the salt dissolved in water is completely precipitated by AgNO_3 , washed, digested with cold saturated solution of Am_2CO_3 , filtered and the filtrate supersaturated with HNO_3 , the production of a white precipitate indicates chlorides.

It being almost impossible to entirely free the commercial bromine from chlorine without enhancing the cost of it to a great extent, we must expect the presence of chlorides to a greater or less extent among commercial samples. It seems to be generally accepted that the limit should be placed at 3 per cent., as given by the Pharmacopœia.

The requirements of the U. S. P. test were applied in all cases, though in some, where there were carbonates, nitrates, etc., present to considerable extent, the test was considered of no value; and on this account some of the tests were dropped from the table.

Now, if the salt be *pure* KBr , 25.21^{cc} of the silver solution will be required. Since 25.21^{cc} contain .4284 grains of nitrate of silver, then

$$\frac{\text{Ag N O}_3}{170} : \frac{\text{K Br.}}{119} = 4284 : .3$$

If the salt be pure potassium chloride, 40.26^{cc} of the silver solution will be required.

The difference in amount of silver solution required for the 3 decigrams of the two salts, will then be $40.26^{\text{cc}} - 25.21^{\text{cc}} = 15.05^{\text{cc}}$. Then for each .1505^{cc} of silver solution required in *excess* of 25.21^{cc}, to effect complete precipitation, 1 per cent. of potassium chloride will be represented as

$$\frac{15.05}{100} = .1505.$$

EXAMPLE.

Three decigrams of a salt, when titrated with A-100 solution of Ag. N O_3 , 28.5^{cc} were required to complete the reaction; and as $28.5 \times .0119 = .3391$ gms., the volume of silver solution used is therefore in excess of that required for pure bromide of potassium, for .3 (amount taken) should require 25.21^{cc}, since

$$\begin{aligned}
 & (.3 + .0119 = 25.21) \text{ and} \\
 & 19.7^{\circ} \text{ A-100 silver} \times .0119 = .23444 \text{ KBr.} \\
 & 8.8^{\circ} \text{ A-100 silver} \times .00745 = .06556 \text{ KCl.} \\
 & \qquad \qquad \qquad .30000 = \text{KBr and KCl.} \\
 & .23444 + .3 \times 100 = 78.2 \text{ per cent. KBr.} \\
 & .06557 + .3 \times 100 = 21.8 \text{ per cent. KCl.} \\
 & \qquad \qquad \qquad 100. \text{ per cent.}
 \end{aligned}$$

Those tests that depend on the gravimetric and volumetric estimation of the silver, by weight of silver precipitate obtained or volume of silver solution required for precipitation, require accurate operations with a perfectly dried salt; and should there be more than one impurity present, their results are of little or no value.

7. ESTIMATION (GRAVIMETRIC).

"1 gram of powdered and dried salt, when completely precipitated by nitrate silver, yields, if perfectly pure, 1.579 grains of dry bromide of silver." (U. S. P., 1880.)

"10 grains of it require, for complete precipitation, 14.3 grains of nitrate of silver" (U. S. P., 1870.)

"10 grains require, for complete decomposition, 840 grain measures of the volumetric solution of nitrate silver." (Ph. Br.).

It will be seen that the U. S. P. of 1870 and 1880 correspond closely with the metric system making the change; the B. P. test being more of a volumetric than gravimetric test.

In the U. S. P. test, should the solution be pure potassium bromide, the amount of Ag. Br. obtained would be 1.58 grains; should it contain potassium or sodium chloride, the weight, provided the salt is free from other impurities, will be greater in proportion to the amount of impurities present, since the molecular weights of the *others* are lower. This latter forms a kind of check test, which might be applied first, giving an idea as to the nature and proportion of the adulterants, should there be any.

8. MOISTURE.

Determined by loss of weight when salt is dried at 100° C. (212° F.).

"When subjected to heat does not lose weight" (U. S. P., 1870).

"At dull red heat the salt melts without losing weight" (U. S. P., 1880).

9. NITRATES.

Bromide of potassium, contaminated to a considerable extent with nitrates, has appeared in the English market occasionally in past years; possibly, in view of this, the specimens were examined for this radical. If the salt be free from bromate, nitrates may be detected by the intense yellow coloration, when a portion of the powdered salt is heated to the boiling point with an excess of dilute H₂SO₄; also another test was to precipitate with an excess of AgSO₄ to remove Br, then test the filtrate

by the addition of a crystal of Fe_2SO_4 , and H_2SO_4 , the development of a brown black color being indicative of nitrates.

10. SODIUM.

The U. S. P. and Br. Ph. only give means of identifying it as a potassium salt by precipitation with tartaric acid. The Ph. Ger., as above, with violet flame first.

The conformity of the samples with the pharmacopœia requirements are given in the table as compared to the standard, while of those not given the results are so evident as not to require it.

With few exceptions all the samples are soluble in a lesser quantity of water than that required by the Pharmacopœia, and like results with alcohol, in which case the less pure the sample the greater the apparent solubility.

Eleven of the sixteen samples examined gave an alkaline reaction, though some were to a very slight degree, and would answer well the practical requirements of the prescription counter, but some should be discarded.

Only one sample gave evidences of bromate in a quantity that should discard it according to the Pharmacopœia, the two others giving but faint traces. Only one exhibited any traces of iodide, and that was probably present as slight impurity in the bromine.

In eight out of the sixteen samples, no figures for the estimation of chlorides are given, since, as before stated, the amount of carbonates and sulphates present would interfere with an accurate determination, while the remaining ones that are given may be taken for what they are worth, though in these samples the impurities present are hardly in quantity sufficient to interfere with the accuracy of the estimation to any extent.

The largest amount of moisture is found in one of the granulated samples, the two foreign ones being among the least.

Nearly all give the yellow sodium flame at first. It is a very strong requirement on the part of the Pharmacopœia, since the presence of the smallest trace of sodium would give rise to the yellow flame.

On reviewing the table, it is evident that the impurities, with one or two exceptions, are not of such a nature as would give rise to any difficulty as regards their therapeutic application, but many, if not 25 per cent. of them at the very least, would be liable to give rise to difficulties when applied to the manifold and often exacting requirements, of the prescription counter, the presence of the carbonates, chlorides and sulphates in some cases not only being annoying to the dispenser, but also seriously objectionable, from incompatibilities that are liable to arise.

Adrian states that of French bromides, among ten samples obtained, only one was found pure, the others containing from 10 to 15 per cent. of impurities, one even 35 per cent., there being carbonates, chlorides, iodides, and sulphates.

	No. 5.		No. 6.		No. 7.		No. 8.	
	Sample 1.	Sample 2.	Sample 1.	Sample 2.	Sample 1.	Sample 2.	Sample 1.	Sample 2.
Solubility. In water at 100° Cent. U. S. P., '80, in alcohol (97 per cent.), 15° Cent.	1 Pt. in .931 1 Pt. in 180.1	1 Pt. in .942 1 Pt. in 120.2	1 Pt. in .986 1 Pt. in 127.8	1 Pt. in 1.02 1 Pt. in 133.2	1 Pt. in .991 1 Pt. in 116.8	1 Pt. in 1.01 1 Pt. in 114.2	1 Pt. in .921 1 Pt. in 199.5	1 Pt. in .932 1 Pt. in 199.1
Reaction. U. S. P., '80. Color to litmus paper. U. S. P., '70. Color to litmus solution. Mixed with lime water. Alkali.	Neutral. No change. Clear.	Neutral. No change. Clear.	Alkaline. Deep blue. Faint cloudy.	Alkaline. Violet blue. Faint cloudy.	Alkaline. Deep blue. Cloudy.	Strong alkaline. Deep blue. Precipitate.	Neutral. No change. Clear.	Alkaline. Deep blue. Faint cloudy.
Volumetric estimation of CO₂ (per cent. alkali). . . . . .	.06 per cent. Standard.	.02 per cent. Standard.	2.07 per cent. Below standard.	3.10 per cent. Below standard.	1.09 per cent. Below standard.	1.15 per cent. Below standard.	.011 per cent. Standard.	.018 per cent. Standard.
Bromate. Dil. H ₂ SO ₄ on pulverized salt, U. S. P. '80	No color.	No color.	Yellow.	No color.	No color.	No color.	No color.	No color.
Aq. Chlorine and CHCl₃ added to Sol. (Br. P.).	No color. Standard.	No color. Standard.	Deep yellow. Below standard.	No color. Standard.	Pale straw. Hardly standard	Pale straw. Hardly standard	No color. Standard.	No color. Standard.
Iodides. Solution 1 in 10, with starch, U. S. P., '80	No color.	No color.	No color.	Faint blue.	No color.	No color.	No color.	No color.
Solution 1 in 100, with Fe₂Cl₆ and CHCl₃.	No color.	No color.	No color.	Pale blue.	No color.	No color.	No color.	No color.
Chlorides. For presence — AgNO ₃ + Am ₂ CO ₃ + HNO ₃	Faint colored.	Faint cloudy.	Cloudy.	Precipitate.	Cloudy.	Precipitate.	Faint colored.	Faint colored.
Per cent. chlorides (volumetric test), U. S. P., '80.	4.2 per cent.	4.6 per cent.	. . . . .	. . . . .	. . . . .	. . . . .	4.1 per cent.	4.9 per cent.
Sulphates. Addition of BaNO ₃ , U. S. P., '80.	Clear. Standard.	Clear. Standard.	Cloudy. Standard.	Precipitate. Not standard.	Clear. Standard.	Clear. Standard.	Faint cloudy. Not quite standard.	Clear. Standard.
Moisture. Loss at 100° Cent. (212° F.) . . . . .	.7 per cent.	.5 per cent.	1.1 per cent.	.4 per cent.	1.2 per cent.	.9 per cent.	.4 per cent.	.6 per cent.
Estimation (Gravimetric). Precipitate by AgNO ₃ , U. S. P., '80, 1.579 gms. AgBr.	1.59 Gm.	1.602 Gm.	1.990 Gm.	1.65 Gm.	1.581 Gm.	1.579 Gm.	1.586 Gm.	1.592 Gm.
Sodium. Identified as Kalium, U. S. P.	Yellow. K.	Violet. K.	Violet. K.	Violet. K.	Yellow. K.	Yellow. K.	Yellow. K.	Yellow. K.
Flame test, Ph. Ger.	Negative.	Negative.	Negative.	Traces.	Negative.	Negative.	Negative.	Negative.
Nitrate. Boiling with H ₂ SO ₄	Negative.	Negative.	Negative.	Traces.	Negative.	Negative.	Negative.	Negative.

The eight samples examined, I think, very fairly represent our market as the salt now is supplied to the retail trade ; and two examinations of each maker's product, taken from eight to ten months apart, will allow a fair representation of the probable variations of the quality of his goods. The foreign samples are those put forth by foreign makers of high standing, and it will be seen that three of our American samples stand fully equal to, if not better in some particulars, than the European (Nos. 4 and 8).

Of the two granulated salts, one averages very well, and sustains the claims as to its quality, while the other is not much better than the poorer samples.

Since bromide of potassium is usually given in much larger doses than the corresponding iodide, and, in some instances, frequently in large quantities, it is therefore of considerable importance that it should be dispensed in a reasonably pure state, free from admixture with other salts or foreign substances which might produce powerful effects upon the system. Therefore, while considering the average quality of our supply of this salt to be *very fair* (though some of our so-called reliable brands are better than this), it behooves the buyer to exercise some care in his selection, in order to obtain a medicinal salt meeting the Pharmacopœial requirement. Too often are these all-important points overlooked, and the quality of the salt disregarded, in order to meet the lowest market figure. The manufacturers need the encouragement of an intelligent appreciation on the part of the retail pharmacist in order to raise the standard of their products.

Considering the strong and wide-awake competition, characteristic of these days, should we ask manufacturers to stimulate the demand for a better quality of their products? It is obviously the duty of pharmacists to lend encouragement by placing a premium on the best medicines.

MERCUROUS AND MERCUROSO-MERCURIC IODIDES.*

BY HENRY MACLAGAN.

After reading over the physical characters of mercurous iodide, as given in the various pharmaceutical and chemical works, a student of chemistry would scarcely imagine that the substance under consideration was a definite chemical compound, or, accepting this fact, would not have as high an opinion of the inflexibility of chemical laws as they are entitled to. One authority states that its color is dark olive-green, another that it is yellowish-green, another greenish-yellow, and still another says yellow ; and it is scarcely possible that these differences can be due to mere errors of judgment on the part of the describers, the

* Read at the Fifth Session.

variation being too wide to admit of this theory. What, then, is the cause of this difference? There is but one answer to that question, viz., that the substances described were not pure mercurous iodide, and the variations in color were simply due to varying proportions of impurity. The very method of its manufacture, the direct union of the two elements, is in itself sufficient to prove that, as a slight consideration of it will show. When chemical equivalents of mercury and iodine are rubbed together, some red iodide is always formed. This cannot well be prevented, and it is only by long-continued trituration that it can be reduced; and no maker ever takes the trouble to do this, but, after a certain point is reached, is contented with washing out the red with alcohol. The resulting product then is clearly not pure mercurous iodide, but a mixture of this and metallic mercury; for it is plain that if a part of the mercury takes double its share of iodine, another part must go without any, and different proportions of free metal easily account for the various colors. From a medical point of view there is perhaps not much objection to a little of this, as it can have but little other effect than to lessen the actual amount of iodide in the dose given; still even this is not desirable when the quantity varies from three to eighteen per cent., as the writer has found it.

If to a solution of mercurous nitrate in water acidulated with nitric acid potassium iodide is slowly and cautiously added, a precipitate is produced which is of a pure yellow color, and which, when washed with water and dried, is about twice the weight of the potassium iodide used. Alcohol shaken with it and dropped into water gives no evidence of red iodide, and repeated careful analyses show its composition to be, in 100 parts, iodine 38.8, mercury 61.2; in other words, that it is mercurous iodide. Assuming, then, that mercurous iodide is yellow, it becomes a very easy matter to account for the greenish color of most commercial samples, because we know that finely divided mercury is blue, and that blue and yellow make green. That the pure salt is yellow it is hoped will be established by the facts here given and the specimens which accompany this paper.

Nos. 1 to 5, inclusive, are specimens purchased in market, and are shown to illustrate the unequal results of the usual methods of manufacture. Analyses accompany each, and it will be seen that the greenish color is exactly in proportion to the amount of free mercury present, and that the nearer the salt approaches purity the more yellow it becomes. No. 1, with 16 per cent. of free mercury, is a dark olive-green, and No. 4, with only 3 per cent. is almost a pure yellow. No. 5 contains 8 per cent. of free Hg, and 10 per cent. of red iodide. Nos. 6 to 10 are all pure mercurous iodides, as shown by analyses, prepared in different ways, and it will be observed that the yellow color is uniform throughout. No. 6 was made by precipitating a solution of mercurous nitrate with potas-

sium iodide ; No. 7, by the reduction of mercuric iodide with hypophosphorous acid ; No. 8, by adding to a solution of mercurous nitrate a solution of potassium iodide to which iodine has been added ; No. 9, by the addition of alcoholic solution of iodine to a solution of mercurous nitrate ; and No. 10, by the U. S. P. method, using a little excess of iodine toward the close to insure the absence of free mercury. Nos. 8 and 9 will be referred to again further on. In all these cases the products are similar, not only in color, but in chemical composition, as shown by analyses, all of them being pure mercurous iodide.

In Watts's " Dictionary of Chemistry," the U. S. P., and other works, is described an iodide intermediate between mercurous and mercuric iodides, having the composition Hg_2I_2 , called mercuroso-mercuric iodide, and is said to have a yellow color. I have not yet succeeded in making such a compound, but am convinced that the one described by Watts is nothing but mercurous iodide. He states that mercuroso-mercuric iodide may be made by rubbing mercuric iodide with one-third as much mercury as it already contains, or by adding potassium iodide to a solution of mercurous nitrate, "not collecting the precipitate until it has acquired a yellow color," and also by adding to a solution of mercurous nitrate some potassium iodide solution to which "half an atom of iodine has been added." A solution of mercurous nitrate was treated as directed with the solution of iodine in potassium iodide, the latter being slowly added with constant stirring. For a time a bright yellow precipitate was produced, with colorless supernatant fluid, then the color of the precipitate began to deepen to orange, and finally, long before the mercury in solution was exhausted, the reagent throwing down a bright scarlet powder. A second solution was treated with the same reagent until the color of the deposit was of a reddish orange ; when a little of it was collected and shaken with alcohol, the color soon became bright yellow as at first, and the alcohol dropped into water gave abundant evidence of red iodide, showing that the orange powder was a mixture of red and yellow salts. Some fresh solution was then treated, not going very far with the precipitation, so as to collect some of the pure yellow salt for analysis ; this, when collected and dried was free from taste or smell, wholly volatile, and treated with alcohol gave no evidence of the presence of red iodide. 0.654 gram of it was placed in a beaker with a little alcohol, and a standard solution of iodine added until a slight excess of iodine was apparent, showing that it had all been converted into red iodide. Union took place almost instantly, and the amount of iodine used was 0.253 gram, and the addition of one centigram of the yellow salt removed all trace of free iodine. These figures of course indicated that it was mercurous iodide and not Hg_2I_2 , for if the latter 0.106 gram of iodine should have been sufficient. One gram of the salt was then boiled with an alkali until decomposed, and the iodine estimated with nitrate of sil-

ver: 0.715 gram of silver iodide was obtained, again proving that the salt was HgI.

It may at first sight seem difficult to account for its formation under the circumstances. My theory is as follows:



In other words, a part of the mercurous nitrate is thrown out as mercurous iodide, and the rest changed to mercuric nitrate. This, I think, is shown clearly by the fact of obtaining first yellow and then red iodide from a solution of mercurous nitrate, which treated with potassium iodide alone would have yielded yellow iodide to the end. The second method described by Watt was also tried, with the same result as far as the nature of the salt obtained is concerned. If to a solution of mercurous nitrate an alcoholic solution of iodine is added, precisely the same thing occurs, first yellow, then red, and the yellow on analysis proves to be the same as the others.

In the National Dispensatory (Stillé & Maisch) mercuroso-mercuric iodide is said to be formed when mercurous iodide is sublimed. A reddish-orange crystalline sublimate is the result of this treatment, which certainly has peculiar properties, but its composition I have not yet had time to determine.

New York, August, 1884.

ON CREAM OF TARTAR SOLD BY PHARMACISTS AND BY GROCERS.*

BY GEO. W. KENNEDY.

QUERY NO. 13.—*Pharmacists often have the price of cream of tartar sold by grocers thrown up to them as a standard of the value of this substance. What proportion of the cream of tartar sold by grocers and by druggists will conform to the U. S. F.?*

In order to answer this query satisfactorily, the acceptor obtained samples of the salt, for which he is indebted to members of this Association, residing in the following cities of our country: Chicago, Cincinnati, Boston, Brooklyn, Philadelphia, Baltimore, St. Louis, Washington, Richmond, Louisville, Indianapolis, Williamsport, Pa., and Pottsville, Pa. Two samples were obtained from each of the above-named places—one from a grocery store and one from a drug store—excepting Indianapolis, from which place I received three packages—two from druggists and one from a grocer.

Before giving the results of my investigation, I would say that I am well pleased—yea, highly delighted—to know that but a few of the twenty-seven (27) specimens under consideration were found to be sophisticated.

* Read at the Fifth Session.

I can assure you it affords me much pleasure to so report to the Association. It also exhibits a decided improvement compared with a number of samples examined by the writer in answer to a query published in the Proceedings of the Pennsylvania Pharmaceutical Association for the year 1882, page 144, when of ten samples of the salt examined and sold by grocers not one was found to be pure. This year, of the fourteen samples obtained from druggists, I found but one adulterated, and that containing approximately 27 per cent. of a mixture of chalk, alum, and starch. The other thirteen samples contained a small percentage of tartrate of calcium, which is known to be found in cream of tartar from 5 to 10 per cent., and is occasionally met with to the extent of 15 per cent.; this is not considered an adulteration, as it cannot be wholly removed in the process of purifying the salt by simple recrystallization. Of the thirteen specimens procured from grocery stores, seven were found to be adulterated. The percentages of impurities are as follows: 20.25, 28.50, 76., 77., 78., 87.50.

It will here be observed that of the cream of tartar sold by druggists, one in fourteen was found to be adulterated, or, in other words, about 7 per cent. of the drug stores sell adulterated cream of tartar. With the grocers, seven in thirteen were found to be impure, or about 50 per cent. of the grocery stores sell the adulterated substance.

In each of the twenty-seven specimens examined 100 grains of the salt was used.

In searching for sulphates and chlorides, one drachm of the salt in one ounce of warm water was used; portions of the clear liquid, after being cooled, acidulated with a few drops of nitric acid were then tested with barium nitrate for sulphates, and with argentic nitrate for chlorides.

In testing for starch the substance was previously digested in aqua ammoniæ, sp. gr. 0.960, and the insoluble portion then boiled with water, when a small quantity of iodine tincture was added. If starch is present, the blue characteristic color is produced.

The balance of the investigation was conducted as laid down by "Stillé & Maisch," by dissolving the substance to be examined in an excess of ammonia water, in which it should be completely soluble, and this solution should not be precipitated by hydrosulphuric acid (absence of copper and iron), or by oxalate of ammonium (absence of calcium salts). If cold hydrochloric acid is added to the residue left after treatment with ammonia, terra alba, starch, and some gypsum undissolved will remain insoluble, and effervescence will follow if chalk is present. The acid solution mixed with an excess of ammonium or sodium acetate, should not yield white precipitates, with ferric chloride (phosphates), ammonia (alumina), or carbonate of ammonium (calcium salts).

The packages obtained at drug stores, with few exceptions, were neatly tied up and labeled; those obtained from grocery stores, with two exceptions, were not labeled and were unsightly packages.

TABLE OF RESULTS.

Sample No.	Where obtained	Amount soluble in Ammonia.	Amount of Impurities.	Examination of the Ammoniacal Solution.			Examination of Insoluble Portion after Treatment with Ammonia.							Solution of the Substance Produced with		Impurities.
				Hydro-sulphuric Acid.	Oxalate of Ammonium.	Iodine.	Dilute Hydrochloric Acid.	Ammon. Acet. with Ferric Chl.	Ammonia.	Carb. Ammonium.	Barium Nitrate.	Argentie Nitrate.				
1	Boston	94.00 gra.	6.00 gra.	No precipitate, discolored slightly.	Little opaque.	No change.	No effervescence. Clear solution.	No precipitate.	No precipitate.	Light precipitate.	No precipitate.	No precipitate.	Tartrate of calcium. (This is not necessarily an adulteration.)			
2	Chicago	93.25 "	6.75 "	do	do	do	do	do	do	do	do	do	do			
3	St. Louis	93.50 "	7.50 "	do	do	do	do	do	do	do	do	do	do			
4	Louisville	93.00 "	7.00 "	do	do	do	do	do	do	do	do	do	do			
5	Brooklyn	93.00 "	7.00 "	do	do	do	do	do	do	do	do	do	do			
6	Cincinnati	93.00 "	5.00 "	do	do	do	do	do	do	do	do	do	do			
7	Baltimore	93.00 "	12.00 "	do	do	do	do	do	do	Heavy precipitate.	do	do	do			
8	Richmond	93.50 "	6.50 "	do	do	do	do	do	do	Light precipitate.	do	do	do			
9	Philadelphia	94.00 "	6.00 "	do	do	do	do	do	do	Heavy precipitate.	do	do	do			
10	Washington	91.00 "	9.00 "	do	do	do	do	do	do	Light precipitate.	do	do	do			
11	Williamsport, Pa.	92.50 "	7.50 "	do	do	do	do	do	do	Light precipitate.	do	do	do			
12	Pottsville, Pa.	93.00 "	7.00 "	do	do	do	do	do	do	do	do	do	do			
13	Indianapolis (1)	93.50 "	6.50 "	do	do	do	do	do	do	do	do	do	do			
14	Indianapolis (2)	73.00 "	27.00 "	do	No precipitate.	Blue.	Brisk effervescence.	do	Heavy precipitate.	Heavy precipitate.	Precipitate.	do	Chalk, alum, and starch.			
1	Boston	92.00 "	8.00 "	do	Little opaque.	No starch.	No effervescence.	do	No precipitate.	Light precipitate.	No precipitate.	do	Tartrate of calcium.			
2	Chicago	23.00 "	77.00 "	do	No precipitate.	Blue.	Effervesces; not all soluble.	do	Heavy precipitate.	Heavy precipitate.	Heavy precipitate.	Precipitate.	Starch, clay, lime, alum, and chloride.			
3	St. Louis	80.00 "	20.00 "	do	Slightly opaque.	do	No effervescence.	do	do	Light precipitate.	do	No precipitate.	Starch, alum, lime.			
4	Louisville	93.00 "	7.00 "	do	do	No starch.	do	do	No precipitate.	do	No precipitate.	do	Tartrate of calcium.			
5	Brooklyn	12.50 "	87.50 "	do	No precipitate.	Blue.	Effervesces and powder not soluble.	do	Heavy precipitate.	Heavy precipitate.	Dense precipitate.	Light precipitate.	Starch, clay, alum, lime.			
6	Cincinnati	88.50 "	11.50 "	do	Slight opaque.	No starch.	No effervescence; powder soluble.	do	No precipitate.	Precipitate.	No precipitate.	No precipitate.	Tartrate of calcium.			
7	Baltimore	89.00 "	11.00 "	do	do	do	do	do	do	do	do	do	Tartrate of calcium.			
8	Richmond, Va.	24.00 "	76.00 "	do	Precipitate	Blue.	Effervesces; powder insoluble.	do	Precipitate.	do	Precipitate.	do	Alum, clay, starch, calcium.			
9	Philadelphia	87.00 "	13.00 "	do	do	No starch.	No effervescence; powder soluble.	do	No precipitate.	do	No precipitate.	do	Tartrate of calcium.			
10	Washington	90.00 "	10.00 "	do	do	do	do	do	do	do	do	do	Tartrate of calcium.			
11	Williamsport, Pa.	22.00 "	78.00 "	do	do	Blue.	No effervescence; powder not soluble.	do	Heavy precipitate.	do	Precipitate.	do	Starch, clay, alum, lime.			
12	Pottsville, Pa.	75.00 "	25.00 "	do	do	No starch.	No effervescence; powder soluble.	do	do	Heavy precipitate.	do	do	Alum, lime.			
13	Indianapolis	71.50 "	28.50 "	do	No precipitate.	Blue.	No effervescence; powder nearly soluble.	do	do	Light precipitate.	do	do	Alum, starch, lime.			

Obtained from Grocery Stores.

From Drug Stores.

From Drug Stores.

Obtained from Grocery Stores.

ON HYDRASTINE.*

BY PROF. FREDERIC B. POWER, PH. D.

The alkaloid hydrastine was observed by Durand,† of Philadelphia, as early as 1851, but, although its alkaline nature was noticed, he did not succeed in preparing it in a pure state. It was afterward more closely examined by J. D. Perrins,‡ of Worcester, England, in 1862, who first separated it from *Hydrastis canadensis* in a relatively pure form, and described some of its reactions, but did not institute an elementary analysis. The following year it was analyzed and some of its other properties noticed by F. Mahla,|| of Chicago, who assigned to it the empirical formula $C_{22}H_{24}NO_6$. From Mahla's analytical results the formula $C_{22}H_{22}NO_6$ has been deduced by Kraut, and this has since been generally accepted.

The investigation undertaken by me had primarily for its object the verification of the empirical formula of the alkaloid and the determination of its crystalline form, but, as opportunity permitted, was afterward considerably extended in its scope.

The alkaloid which was employed for the present investigation was kindly prepared for me by Professor J. U. Lloyd, of Cincinnati, and represented a substance of rare purity, having been precipitated and crystallized about thirty consecutive times. To the kindness and liberality of Professor Lloyd, I am also indebted for the method employed by him in the preparation of the alkaloid, which is as follows:

PROCESS OF MANUFACTURE.

One thousand pounds of powdered *hydrastis canadensis* were properly moistened with alcohol, packed in a suitable percolator, and percolation then conducted with the use of officinal alcohol as a menstruum. Sulphuric acid, in strong excess, was added to the percolate, and, after four hours, the supernatant liquid filtered from the mass of crystals of sulphate of berberine ($C_{20}H_{17}NO_4H_2SO_4$). To this filtrate ammonia water was added until it showed but a slightly acid reaction, then strained to separate the precipitated sulphate of ammonium, distilled to a syrupy consistence, and the residue poured into ten times its bulk of cold water. After twenty-four hours the precipitated resinous substances, oils, etc., were separated from the liquid by filtration, the filtrate being an impure solution of sulphate of hydrastine. Ammonia water, in decided excess, was then added to this resultant liquid, and the precipitate of impure hydrastine collected and dried. It was then digested with one hundred

* Read at the Third Session.

† Amer. Journ. Pharm., 23, 112.

‡ Pharm. Journ. Trans., (2) 3, 546.

|| Silliman's Amer. Journ., Vol. 36, No. cvi., p. 27.

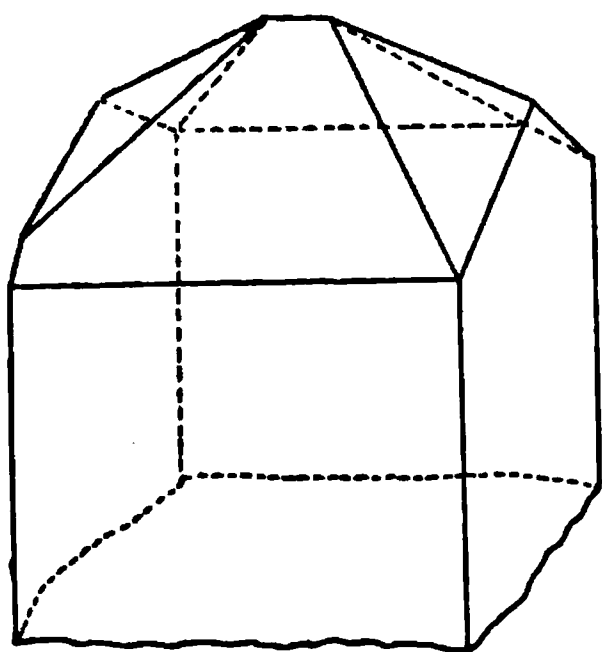
times its weight of cold water, to which sulphuric acid was carefully added to *slight* acid reaction ; and, after twenty-four hours, filtered. The filtrate was again precipitated with excess of ammonia water, the precipitate collected on a strainer and dried. The precipitate was powdered, and extracted with boiling alcohol, from which impure, dark yellow crystals of hydrastine separated when the alcoholic solution was cooled. The crystals were purified by repeated crystallization from boiling alcohol. In order to obtain the hydrastine perfectly colorless, when in the form of large crystals, many crystallizations are necessary. Small crystals appear to be white, when in reality they are considerably colored, and which is partly due to the fact that they are prone to become opaque from the presence of numerous fractures.

CRYSTALLINE FORM.

For determination of the crystalline form of the alkaloid some carefully selected and handsomely developed crystals were also furnished me by Professor Lloyd. By the crystallization of relatively small amounts, the faces of the crystals are rarely, if ever, perfectly developed, and, even when operating upon larger quantities, this is also frequently the case, from the fact that the crystals almost invariably form with their lateral surfaces attached to the sides of the crystallizing vessel.

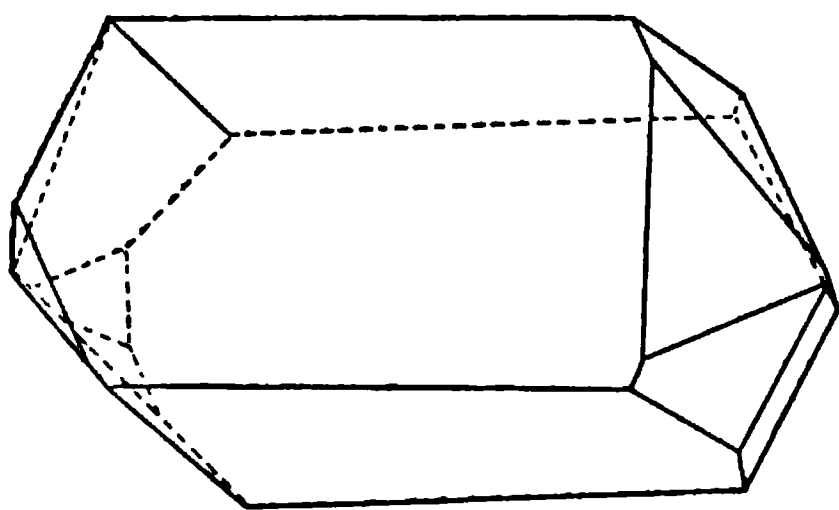
The crystals which attain a maximum length of from eight to ten millimeters, have the form of four-sided prisms (Fig. 65 and 66), and apparently

FIG. 65.



Crystal of Hydrastine.

FIG. 66.



Crystal of Hydrastine.

belong to the ortho-rhombic system, although the goniometer at my disposal did not admit of the exact measurement of the angles. The drawings here presented, which represent typical crystals, were formed from an orthographic perspective, and the angles may be said to be as geometrically accurate as is possible to obtain them without absolute measurements. In Fig. 66 the terminal faces are shown to be very perfectly developed, while Fig. 65 represents a crystal as viewed somewhat from the side and from above, the terminal faces not so symmetrically developed,

and therefore having a somewhat more complicated form. It is interesting to observe that when both ends of the crystals are developed, as shown in Fig. 65, the corresponding terminal faces of opposite ends are invariably inclined to each other at an angle of exactly 90 degrees.

PHYSICAL PROPERTIES.

The crystals of hydrastine are anhydrous, and, when pure, perfectly colorless, and very brilliant. They fuse at 132° C. (Mahla, *loc. cit.*, states 135° C.), to a light, amber-colored liquid. When heated on platinum foil they decompose with the evolution of empyreumatic, inflammable vapors, reminding, as Mahla had previously observed, somewhat of carbolic acid, and leaving a large amount of ash, which burns slowly away at a red heat.

Hydrastine is insoluble in water and in petroleum benzin, these liquids leaving, after prolonged contact with the alkaloid, no perceptible residue upon evaporation, and the aqueous liquid is not affected by potassio-mercuric iodide; it is soluble, however, in dilute acids, and in chloroform, benzol, ether, and alcohol.

The degree of solubility in the four latter liquids was determined by digesting the alkaloid with the solvent in closed tubes for several days, at a temperature of 15° C., with frequent agitation, filtering into tubes provided with tightly-fitting stoppers, and, after weighing, evaporating to dryness, and finally drying the product at 100° C. The relative solubility is then calculated by the formula $\frac{a-b}{b}$, where a represents the amount of solution employed, and b the amount of residue left upon evaporation. 4.858 grams of the chloroform solution gave 1.765 grams of alkaloid; 5.688 grams of benzol solution gave 0.340 grams; 5.068 grams of ether solution gave 0.060 grams; and 4.487 grams of alcohol solution gave 0.037 grams of alkaloid. One part of alkaloid is therefore soluble in 1.75 parts of chloroform, in 15.70 parts of benzol, in 83.46 parts of ether, and in 120.27 parts of alcohol. It is naturally much more freely soluble in these liquids when hot, but to what extent I did not attempt to determine.

Through the kindness of Prof. Flückiger, of Strasburg, I have ascertained the action of hydrastine upon polarized light, as determined by the polaristrobometer of Wild. Ten parts of the alkaloid, dissolved in 97 parts of chloroform, deviate the polarized ray, in sodium light, with a column of 100 millimeters—17°; with a column of 50 millimeters—8, 5°. From these data I have calculated the *specific rotation* to be $(\alpha)_D = -170^\circ$, as deducted from the following formula:

$$(\alpha)_D = \frac{\alpha V}{l K}$$

where α = the angle of rotation in sodium light, or -18°

V = the volume of liquid, or 100 ccm.

l = the length of the applied column of liquid, expressed in decimeters, or 1.

K = the weighed amount of substance, or 10 grams,

$$\text{or } (\alpha)_D = \frac{100 \alpha}{l \cdot c}$$

where c represents the number of grams of substance in 100 ccm. of solution, or 10.

From the *specific* rotation, the *molecular* rotation may then be calculated according to the formula of Krecké, which expresses the angle of rotation effected by an equal number of molecules in unity of volume, when a ray of light passes through a layer of 1 millimeter in thickness.

$$[M] = \frac{P [\alpha]}{100}$$

$$[M] = -674.9^\circ,$$

where P represents the molecular weight of hydrastine, or $C_{22}H_{22}NO_6 = 391$, and $[\alpha]$ its specific rotation, or -170° .

CHEMICAL EXAMINATION AND ANALYSIS.

The crystals of hydrastine are affected in the following manner by re-agents :

Concentrated sulphuric acid produces a yellow color, which, in contact with a crystal of potassium bichromate, becomes brown.

Concentrated sulphuric acid, on warming, produces a bright red color.

Concentrated nitric acid produces, in the cold, a yellow color, changing to reddish-yellow.

Concentrated hydrochloric acid gives no coloration, either in the cold or upon warming.

Concentrated sulphuric acid and molybdate of ammonium gives an olive-green color, which appears to be its most characteristic test.

The solution of the hydrochlorate is affected as follows by re-agents :

Ammonia water and the fixed alkalies give a white, curdy precipitate, sparingly soluble in excess ; potassium iodide, potassium mercuric iodide, potassium ferrocyanide, potassium sulphocyanide, mercuric chloride and tannic acid produce white precipitates ; iodine in potassium iodide, a light brown precipitate ; potassium bichromate, a yellow precipitate ; picric acid, a bright yellow precipitate ; platinic chloride, an orange yellow precipitate ; auric chloride, a deep yellowish-red precipitate.

The ultimate analysis of the alkaloid was performed by its combustion with oxide of copper, in a tube provided with a glowing copper spiral. 0.2600 gram of hydrastine gave 0.6360 gram CO_2 = 66.69 per cent. C., and 0.1315 gram H, O = 5.61 per cent. H.

Since Mahla estimated the nitrogen by burning with soda-lime, and subsequently converting the ammonia into the platinum double salt, it is therefore of interest to compare the result which I have obtained by Dumas' method, by the direct estimation of the volume of nitrogen gas.

0.648 gram of hydrastine, when burned with oxide of copper in an atmosphere of CO_2 , and the gas led over a glowing copper spiral, afforded 21 ccm. of nitrogen. The percentage is then calculated according to the following formula:

$$G = \frac{V}{1 + 0.00367t} \cdot \frac{B-f}{760} \cdot 0.001256$$

where G = the weight of nitrogen sought.

V = the observed volume of gas in cubic centimeters, or 16.

0.00367 = the coefficient of expansion of the gas for each degree Centigrade.

t = the temperature of the gas, or 16°C .

f = the tension of aqueous vapor at the temperature t , or 13.536 millimeters.

B = the barometric pressure, or 737.2 millimeters.

0.001256 = the weight of one cubic centimeter of nitrogen, expressed in grams, at 0°C ., and under 760 mm. pressure.

G is then equal to 3.46.

Calculated for $\text{C}_{22}\text{H}_{23}\text{NO}_6$	Found	
	Power	Mahla.
C = 66.48 per cent.	66.69 per cent.	66.69 66.38
H = 5.79 per cent.	5.61 per cent.	6.01 5.69
N = 3.53 per cent.	3.46 per cent.	3.83 3.76
O = 24.20 per cent.		
100		

The results of both our analyses are seen to agree quite closely with the accepted formula, which may therefore now be presumed to be correct. It is also quite evident that there is no simple relationship between hydrastine and the alkaloid berberine, $\text{C}_{20}\text{H}_{17}\text{NO}_4$, such as exists e. g., between the associate alkaloids, morphine and codeine, or caffeine and theobromine.

Mahla prepared the *hydrochlorate of hydrastine*, and obtained it in the form of an uncrystallizable white gum-like substance, which can readily be powdered, and is easily soluble both in water and alcohol. This salt was found to contain 8.46 per cent. HCl , and has therefore the formula $\text{C}_{22}\text{H}_{23}\text{NO}_6 \cdot \text{HCl}$, which requires 8.42 per cent. HCl .

From the hydrochlorate Mahla prepared and analyzed the *platinum double salt*, and obtained therefrom 16.17 per cent. of platinum. This salt has therefore the formula $(\text{C}_{22}\text{H}_{23}\text{NO}_6 \cdot \text{HCl})_2 + \text{PtCl}_4$, which requires 16.15 per cent. of platinum.

An analysis of both of these salts, prepared by myself, confirms the correctness of these results, and need not therefore be repeated.

Since, however, the sulphate and the gold double salt have not to my knowledge hitherto been analyzed, I have prepared and analyzed both

of these. The *sulphate of hydrastine* is amorphous*, and of a light brownish color, but affords a nearly white powder. For analysis it was dried at 100°C . 1.0625 grams of the sulphate gave 0.2916 gram $\text{BaSO}_4 = 0.1227 \text{H}_2\text{SO}_4$, or 11.54 per cent. The formula $(\text{C}_{22}\text{H}_{23}\text{NO}_6) \text{H}_2\text{SO}_4$ requires 10.98 per cent. H_2SO_4 .

The *gold double salt* was prepared from the hydrochlorate by precipitation with auric chloride. It is of a deep yellowish-red color, quite hygroscopic, and fuses at the temperature of the water-bath to a reddish liquid, which, upon cooling, becomes brittle and resinous in appearance.

0.3310 gram of hydrastine-gold chloride, dried at 100°C ., gave 0.0560 gram of metallic gold, or 16.92 per cent. The formula $(\text{C}_{22}\text{H}_{23}\text{NO}_6.\text{HCl})_2 \text{AuCl}_3$ requires 16.78 per cent. of gold. I attempted to prepare the *nitrate* by dissolving the alkaloid in warm dilute nitric acid, but as decomposition appeared to ensue, it was afterwards formed by the decomposition of the sulphate with barium nitrate. As obtained in this way the salt was found to be uncrystallizable, resembling in appearance the sulphate and hydrochlorate.

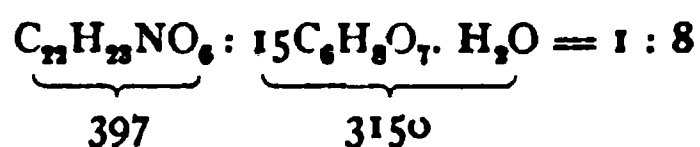
The *acetate* may readily be prepared in solution by dissolving the alkaloid in acetic acid, but upon evaporation, even with an excess of acid, it finally becomes decomposed, with the separation of the alkaloid.

With the hope that some of the salts of hydrastine with the organic acids might be crystallizable, weighed portions of the alkaloid were dissolved in warm alcohol, and mixed with alcoholic solutions of citric, tartaric, oxalic, salicylic and benzoic acids respectively, in the proper theoretical proportions. The solutions after admixture retained a slightly acid reaction, and, after standing for some time, well developed crystals were separated, differing in each case in appearance according to the acid employed, but upon examination they were found to be insoluble in water, either hot or cold, and to consist simply of the pure alkaloid. I then attempted to prepare the citrate and tartrate by adding to the warm alcoholic solutions of hydrastine aqueous solutions of citric and tartaric acids, in the proper molecular proportions to form neutral salts, but upon the evaporation of such solutions the alkaloid again became separated. The conclusion may therefore be drawn from these experiments that hydrastine is not only a very weak base, but also incapable of forming any crystallizable simple salts.

After these experiments had been made, a commercial preparation termed "*soluble citrate of hydrastine*," was brought to my notice, which was examined, with the following result: It is a light, yellowish-gray, amorphous powder, readily soluble in water, with the exception of a small amount of resinous matter, and affording, after filtration, a bright,

* It may be stated that the *crystallized* sulphate of hydrastine advertised by some manufacturers is simply the acid sulphate of the yellow alkaloid berberine, to which the name hydrastine is persistently misapplied.

pale, yellowish solution, having a strongly acid reaction. The amount of pure alkaloid which it contained was determined by precipitating the aqueous solution with ammonia water, in slight excess, and extracting the alkaloid with successive portions of chloroform until the aqueous liquid, after acidulation, was no longer affected by potassio-mercuric iodide. 0.9160 gram of the salt, dried at 100° C., afforded 0.1025 gram of hydrastine, or 11.19 per cent. This would correspond to the proportion of one molecule of alkaloid to fifteen molecules of citric acid, or one part, by weight, of alkaloid to eight parts of acid = 11.19 per cent.



A neutral salt ($C_{27}H_{23}NO_6 \cdot 3C_6H_8O_7 + H_2O$, would require the proportion of about five parts of alkaloid to one part of acid. The permanence and solubility of this preparation is therefore easily explained by the very large excess of citric acid employed.

In order to ascertain whether hydrastine is capable of yielding a hydro-compound, five grams of the alkaloid were dissolved in dilute sulphuric acid, and subjected for about two days to the action of the nascent hydrogen, as developed from metallic zinc and platinum. The liquid was then filtered, precipitated by ammonia water, in slight excess, and the precipitate, after washing, dissolved in hot alcohol, and allowed to crystallize. The crystals are insoluble in water, and closely resemble in appearance those of hydrastine, but possess a slightly yellowish tint, which could not be removed by repeated crystallization. The melting point also lies close to that of hydrastine, being observed at 131° C. I have not as yet subjected these crystals to ultimate analysis, but have formed therefrom and analyzed the hydrochlorate. The latter, like the hydrochlorate of hydrastine, is amorphous, and remains, by the evaporation of its solution, in the form of a transparent, yellowish varnish, yielding, however, a nearly white powder, freely soluble in water. After drying at 100° C., 0.7830 gram of substance gave 0.2560 gram AgCl = 0.0651 gram HCl, or 8.31 per cent.

This result would therefore indicate that a *hydrohydrastine* is thereby formed, by the absorption of four atoms of hydrogen, and is analogous in composition to hydro-berberine, $C_{20}H_{21}NO_4$ (Ann. Chem. Pharm. Suppl., 2, 191).

Calculated for $C_{27}H_{27}NO_6HCl$.	Found.
$HCl=8.34$ per cent.	8.31 per cent.

With iodine and bromine, hydrastine also enters into combination, which is best effected by the use of chloroform solutions, but the products of this reaction, which, in the case of bromine, is attended by the

development of considerable heat, I have not yet further examined. The iodine compound has been obtained in a crystalline form.

Since Mahla has stated (*loc. cit.*) that hydrastine is not affected by a dilute solution of potassa, even by prolonged boiling therewith, I have not repeated this experiment, but its decomposition by fusing with potassium hydroxide has afforded me products of considerable interest.

Ten grams of the alkaloid, reduced to powder, were brought into about four times its weight of fusing potassium hydroxide, contained in a silver dish, when a considerable amount of unpleasant, inflammable vapors were evolved, and the mass assumed an uniform yellow-brown color. This was dissolved in water, dilute sulphuric acid in slight excess added, and the liquid distilled. In the distillate formic acid was detected. The residual acid liquid contained in the flask, was then shaken with ether, the ethereal liquid separated and allowed to evaporate, when a considerable amount of a crystalline acid was obtained, corresponding in all of its reactions to protocatechuic acid, $C_7H_6O_4$. Thus its aqueous solution, even when very dilute, affords with ferric chloride a deep bluish-green color, and upon the subsequent addition of a very small quantity of a highly dilute solution of sodium carbonate, a beautiful blue color is produced. No other acids appear to be formed by this reaction. It may be stated, however, that protocatechuic acid is likewise formed, under the same circumstances, from the alkaloid berberine, as well as from many other substances.

In order to determine, if possible, with which class of organic bases hydrastine may be grouped, whether primary, secondary, or tertiary, it was subjected to the action of ethyl iodide. Ten grams of the alkaloid, in alcoholic solution, were heated for several hours with twenty grams of freshly prepared ethyl iodide on a water bath, in a flask provided with an inverted condenser. In the beginning of the operation a considerable amount of hydriodic acid was evolved. The liquid contained in the flask, after heating for several hours, was of a yellowish color, and no longer separated any crystals upon cooling. Upon the evaporation of the liquid a deep reddish-yellow syrup was obtained, which, upon being treated with alcohol, separated a considerable amount of white crystalline powder. This was collected on a filter, washed with alcohol, and being observed to be quite freely soluble in water, it was dissolved in the latter. From the warm aqueous solution it separates, upon cooling, in small, nearly colorless, crystalline scales. The alcoholic liquid obtained from the first separation of the crystals was of a reddish-yellow color, and was allowed to evaporate nearly to dryness. This residue was then treated with boiling water, which completely dissolved it, but upon evaporation an amorphous residue was again obtained. Upon treating this, however, again with alcohol, an amorphous, dark-colored substance became dissolved, leaving an additional amount of a purely white salt,

which was afterward purified by crystallization from hot water. The crystals are anhydrous, and fuse at about 183° C., but become decomposed at a considerably lower temperature. After drying at 100° C., the salt was analyzed with the following result:

I. 0.7480 gram of the salt gave 0.3280 gram $\text{AgI} = 0.1786$ gram HI, or 23.80 per cent.

II. 0.3075 gram of the salt gave 0.1320 gram $\text{AgI} = 0.0719$ gram HI, or 23.38 per cent.

Calculated for $\text{C}_{22}\text{H}_{22}(\text{C}_2\text{H}_5)\text{NO}_6\text{HI}$.
 $\text{HI} = 23.14\%$

Found.
 I. II.
 23.87% 23.38%

This crystalline compound is therefore evidently the *hydriodate of ethelhydrastine*, formed by the substitution of one atom of hydrogen by the ethyl radical, and hydrastine may be considered, with a considerable degree of probability, as a secondary or imide base. In this respect, according to Henry* and Bernheimer†, it occupies an analogous position to berberine, since they obtained from the latter mono-ethyl and methyl derivatives, while, according to Perrins and Schmidt,‡ in the case of berberine, the simple hydriodate of the base is thereby formed.

That the crystalline compound obtained from hydrastine is really an ethyl derivate is evident, not only from the analysis, but I have also prepared the simple hydriodate by dissolving the alkaloid in freshly prepared hydriodic acid. As thus obtained, it is an amorphous substance and very easily decomposed.

In concluding this investigation, a few words may be said regarding the supposed third alkaloid of *hydrastis canadensis*, the so-called *xanthopuccine*. The presence of such an alkaloid was first intimated by A. K. Hale,|| afterward confirmed by John C. Burt,§ and finally by Herman Lerchen,¶ who endowed it with a name. The very peculiar properties for an alkaloid, which were ascribed to this substance by Mr. Burt, would render it extremely interesting, since he states (*loc. cit.*, p. 482) that "the hydrochlorate solution gave with ferric chloride a dark brown to black solution, and with potassium ferrocyanide a greenish blue solution, while the fact of its precipitating lead acetate is not quite so remarkable, in view of the sparing solubility of lead chloride."

With a desire to examine this substance more carefully, I applied to Prof. Lloyd for a specimen of it, and was not greatly surprised to learn from him that, in working upon thousands of pounds of *hydrastis*, he had never been able to obtain it.

UNIVERSITY OF WISCONSIN, AUGUST 1884.

* Ann. Chem. Pharm., 115, p. 132.

† Gazz. Chim. Ital. xiii., p. 329-342.

‡ Ber. der. Deutsch. Chem. Ges., 1883, p. 2589.

|| Amer. Jour. Pharm., 1873, p. 247.

§ Ibid., 1875, p. 481.

¶ Ibid., 1878, p. 470.

ON THE WATER OF HYDRATION IN COMMERCIAL SULPHATE OF QUININE.*

BY HENRY B. PARSONS, NEW YORK.

QUERY NO. 1.—*What is the proportion of water of hydration in the quinine sulphate of commerce?*

The following percentages were determined by drying one gramme of the quinine sulphate in a water oven for three hours. Repeated trials have proven that all the moisture is expelled by this treatment.

	<i>Brand.</i>	<i>No. Samples.</i>	<i>Average % Moisture.</i>
1. American		16	13.72
2. "		184	12.61
3. German		12	12.32
4. "		634	14.09
5. Italian		169	14.36
Average for all.		1015	13.84

The writer has observed that the differences above noted in the amounts of crystal water in the five brands here reported is tolerably constant and characteristic for each brand. With careful handling, and no more exposure to the air than is necessary, quinine sulphate will contain almost exactly seven molecules of crystal water ($7 \text{ H}_2\text{O}$, equivalent to 14.45 per cent). But if facilities for drying are not the best, and if workmen are careless, and leave the sulphate exposed to the air for too long a time, the amount of crystal water will be less than seven molecules, and is likely to vary considerably in different lots.

This statement is applicable to the brands here reported as No. 1 American and No. 3 German. No 2 American showed much less variation for different lots; the appearance of the crystals was unlike that of all other brands. The amount of crystal water so closely approximated six molecules ($6 \text{ H}_2\text{O}$), or 12.53 per cent., as to raise the question whether the manufacturer, by some particular method of crystallization, did not originally produce this salt rather than the one containing seven molecules.

The brands reported as No. 4 German, and No. 5 Italian, were very constant as regards their content of crystal water; it will be noted that they contained, approximately, seven molecules or 14.45 per cent. Not infrequently twenty or more samples would be examined at one time, of which not one sample would contain less than 14 per cent. of water of hydration, and not one sample more than 15 per cent.

Each sample here reported represents 100 ounces of quinine sulphate, taken from an original can not previously opened. These determinations

* Read at the Fifth Session.

of crystal water were made previous to the application of Kerner's test, as directed by the U. S. Pharmacopœia.

The average percentage of moisture found in the 1015 samples, of five makers, has been stated as 13.84 per cent. This is a trifle more than $6\frac{1}{2}$ molecules, which requires 13.56 per cent. There are numerous interesting questions connected with this subject which, it is hoped, may be considered in any discussion which may arise in consequence of the reading of this paper.

One question which the writer would suggest, and upon which an expression of opinion is desirable, is based upon the following facts. It is well known that ordinary quinine sulphate rapidly loses its crystal water when exposed to the air, until only two molecules, or 4.6 per cent. of combined water remains; but when this point is reached, the salt neither gains nor loses moisture to any appreciable extent, even if it be freely exposed to the air. In view of the definite and stable character of this two-molecule salt, would it, or would it not, be advisable to adopt it in the next (7th) revised edition of the U. S. Pharmacopœia?

As this question is hardly germane in this paper, it is merely suggested as one which may lead to profitable discussion in connection with the results here offered.

THE PRACTICABILITY OF KERNER'S TEST.*

BY HENRY B. PARSONS, NEW YORK.

Answer to Query No. 2.

Kerner's test for the purity of quinine sulphate has been adopted in the latest editions of both the German and the United States Pharmacopœias. The directions of the United States Pharmacopœia are, practically, as follows: One gramme of the quinine sulphate is dried until it ceases to lose weight in a water oven. To the dried residue is added 10 cubic centimetres of distilled water, and the mixture is cooled to 15° C. (59° F.) by setting the dish in iced water if necessary. This temperature is preserved for half an hour, when the liquid is separated by filtration from the undissolved quinine sulphate. Five cubic centimetres of this filtrate, representing one half gramme of the original sample, are now to be gently mixed with 7 cubic centimetres of water of ammonia of specific gravity 0.96 at 15° C.

If the quinine sulphate is of the required purity, the turbidity caused by the first admixture of the water of ammonia should entirely disappear when the mixture is thoroughly accomplished.

The principles upon which this test is based are as follows:

* Read at the Fifth Session.

I. The most common impurity of quinine sulphate is cinchonidine sulphate.

II. Drying the sulphate of quinine serves two purposes, the determination of the percentage of moisture, and, as is asserted by German investigators, the rendering more freely water-soluble of the cinchonidine sulphate present as impurity.

III. Keeping the mixture of sulphates and distilled water at 15° C. for half an hour is necessary if uniform results are to be expected, as the solubility of these sulphates is greatly increased by a higher temperature.

IV. The amount of water is also exactly specified, as the quantity of sulphates dissolved depends directly upon the proportion of the solvent used.

V. By experiments made with pure quinine sulphate, and with commercial samples containing known amounts of other cinchona alkaloids, Kerner and other German chemists, and in this country Prescott, have all accepted the statement that the five cubic centimeters of filtrate, obtained as above described, should afford a clear solution with 7 cubic centimeters of ammonia water of specific gravity 0.96 at 15° C.

This requirement is based upon the fact that only a small amount of quinine sulphate ($\frac{1}{7}$) is dissolved by the cool water used, while a much greater quantity of cinchonidine sulphate (soluble in 100 parts of water at 15° C.) will pass into solution. Also the alkaloid quinine which may be precipitated by the addition of a portion of the ammonia used in this test is redissolved by the addition of much less ammonia water than would be the case with cinchonidine, quinidine, or cinchonine. Hence, if the specified amount of ammonia water fails to produce a clear solution, the presence of an undue amount of other alkaloid is to be inferred.

The question suggested by this query now recurs. Is this a practical and reliable test, whereby a good sample of quinine sulphate may be distinguished from one containing an unauthorized percentage of other alkaloidal sulphates?

Anticipating this question, the writer has aimed, during the past three or four years, to satisfy himself in regard to various points which have been raised at different times in connection with the acceptance or rejection of quinine sulphate. On the whole, it may be stated that the judicious use of Kerner's test will lead to a safe decision in regard to a given sample of sulphate of quinine. The following are some practical results which have been obtained.

Firstly: If the sample of quinine sulphate is dried, as directed by the U. S. Pharmacopœia, the amount of ammonia water required to produce a clear solution is generally, but not always, about 0.5 cubic centimetre greater than where the same sample is not dried before testing.

Whether the impurities are rendered more soluble, as asserted by the Germans, or whether the quinine sulphate itself is more soluble, the writer cannot assert from personal experience.

Secondly. This test is liable to mislead unless every detailed precaution is observed. The sample must be carefully weighed, the distilled water accurately measured, the temperature strictly maintained at 15° C., and, above all, the ammonia water should be of exactly the proper specific gravity, viz: 0.96 at 15° C.

Thirdly. If all these precautions are observed, it is my experience that some brands of quinine sulphate require less than the specified 7 cubic centimetres of ammonia water. The average for the 1033 samples here reported is 6.1 cubic centimetres. Great differences as regards the indications by this test were noticed for the five brands here reported. The following is a summary :

<i>No.</i>	<i>Maker.</i>	<i>No. Tests.</i>	<i>Average Cc. Ammonia.</i>	<i>No. Samples Rejected.</i>
1. American		16	9.5	16
2. "		217	5.7	1
3. German		11	6.1	None
4. "		627	6.0	7
5. Italian		162.	6.8	35

All samples rejected required more than 7 cubic centimetres of ammonia water. Brand No. 5, Italian, was delivered in cans of two sizes ; the larger cans contained quinine rather more bulky than usual, and it was this quinine which failed to meet Kerner's test.

Owing to the fact that every sample marked here No. 1 American, failed to stand the test, it was not deemed advisable to multiply the number of tests. The best of all the brands, as regards purity, seems to be the one marked No. 2 American ; next come Nos. 4 and 3 German, and next No. 5, Italian. Probably the latter would stand about the same as the German brands were it not for the poorer quinine in the large cans above described, which increased the average amount of ammonia required.

In conclusion, the writer would say that, in his opinion, the careful application of Kerner's test will reveal the presence of undue proportions of such foreign alkaloids as have, up to the present time, been found as natural impurities due to imperfect methods of separation on the manufacturing scale. Whether this test will reveal all possible admixtures of the more recently discovered and more rare alkaloids of true and false cinchona barks is a question not answered as yet, but one deserving further study.

In applying Kerner's test in cases where much depends upon the result, I would advise that several samples be taken from different parts of the same can, as it is frequently true that these samples vary considerably. If the average result is unfavorable, the quinine sulphate should be rejected.

MODIFICATION OF KERNER'S TEST.*

BY HENRY MACLAGAN.

This test is, without doubt one of the best yet devised for ascertaining the quality of sulphate of quinine, lowering as it does to a minimum, the possible quantity of cheaper alkaloids, but while it is very useful in the hands of the chemist in his laboratory with every convenience at hand, there are several difficulties in the way of its every day use by pharmacists generally. Its accuracy depends so much upon conditions not always readily secured, that I deem it not a safe test in any but experienced hands. Water of ammonia of certain strength, and an almost absolute correctness of temperature are required, and there are few retail pharmacies in which these requirements can be met. Thermometers, even the best, vary somewhat, and a single degree makes considerable difference here, and even if the examiner were possessed of an accurate instrument, it is not an easy matter to maintain a constant temperature for half an hour, as directed. The strength of the ammonia is perhaps more easily regulated, but even here there is a chance of error, and everything considered, I think it must be admitted that Kerner's test is somewhat liable to lead to erroneous or valueless conclusions.

A modification of it which I have used for some time, and which gives equally correct results, regardless of temperature, etc., is as follows:

About one-fourth of an ounce of sulph. quinine, known to be pure or nearly so, is placed in an eight-ounce stoppered bottle, the bottle filled with water and well shaken. This forms a standard solution, the excess of sulphate keeping the solution always saturated at any temperature. On the same shelf with this is kept some water of ammonia (about 0.960 is best), and some distilled water, so that all three are always the same temperature. When a sample of quinine is to be examined (compared is a better word), about one gramme of it is put in a stoppered bottle with about 10 cc. of the water, the bottle placed on the shelf by the side of the standard solution, and *both* shaken at intervals of half an hour. Five cc. of the standard solution are then filtered off, and the quantity of ammonia necessary for a clear solution ascertained; the same quantity should give a clear liquid with five cc. of the solution to be tested, if the quinine was pure. Or if it is desired to make allowance for one or two per cent. or more of cinchonidine (the most common impurity) that salt can be added to the pure sulphate, and the standard solution made of the mixture in the proportion of 1.0 gramme to 10 cc. of water, the solution to be tested being made in the same way. Pure sulphate of quinine for the standard solution can be had by recrystallizing ordinary sulphate about three times, it is then pretty certain to be pure. The solution will keep indefinitely.

* Read at the Fifth Session.

III. MATERIA MEDICA.

CANUTILLO.*

BY J. W. COLCORD.

Early in the spring of the present year, in the course of a correspondence with Dr. S. Gleeson, of San Antonio, Texas, in reference to the cultivation of foreign medicinal plants in that vicinity, he offered two samples of a shrub plentiful there, that had interested him. He describes it as a shrub growing to the height of from three to four feet, densely branched above—branches ternate, smooth, leafless, or the leaves reduced to small subspinous scales; flower-buds axillary, either opposite, or in whorls of three or more, downy, calyx of 2 or 3 scaly sepals.

Whether it has a corolla or not he neglects to state; but I judge from appearance that it must have a small yellow blossom. In the course of his practice he says he has found Canutillo (pronounced Can-a-teelyo) to be used extensively by the native Indians and others resident in that section, in the treatment of gonorrhœa, mucal inflammation of the urethra, leucorrhœa, renal diseases, etc., and when bruised it is frequently used as a vulnerary and styptic.

As used for internal administration, it was given in the form of an infusion, the dose being a teacupful 3 or 4 times a day.

As this method of administration is manifestly inadmissible for use in our pharmacies, I made the experiment of preparing a fluid extract from a pound or more of the stems received by mail some time in March, promising the doctor that I would communicate the results of my experiments both therapeutically as well as pharmaceutically.

The fluid extract as prepared by me, of which I submit a sample, is in color a reddish dark brown; in taste sweetish, aromatic and astringent.

I have called the attention of several of the physicians in my neighborhood to it, and they have prescribed it.

I have also had a trial made of it in the hospital. The dose that I recommend is a teaspoonful 4 times a day. In each case, as far as I can learn, the results have been satisfactory. One patient reported a case of gonorrhœa cured by it alone in three days, using but one ounce of the extract.

Dr. Gleeson states that he can, from the results of his experience in using it, almost claim that it is a specific in this disease. Whether further trial shall confirm or refute the present good opinion I have formed in regard to its therapeutic value, time and the judgment of others must determine. I take pleasure in submitting for your inspection a sample of the dried shrub.

I have consulted a large number of authorities to obtain the botanical

* Read at the Third Session.

name, but so far have been unable to find anything answering its description.

Canutillo is derived from the Spanish Cana, meaning a little reed or stem. A sample sent to the Herbarium at Cambridge, asking information as to its classification, elicited the following response: "Your shrub is an Ephedra (apparently Ephedra trifurcata), now common on our southern borders. All our species of Ephedra are popular local remedies in syphilitic complaints."

I sent a specimen to Mr. E. M. Holmes, of London, with a similar request for information, particularly as to whether a trial had ever been made as to therapeutic value, but so far have received no response. It seems to me to be worthy of further trial; and if any member desires to experiment with this drug, I have no doubt but that supplies could be obtained of Dr. Gleeson, at small expense, on application.

RHUBARB.*

Its History, Habitat, Culture and Preparation, with Reference to its Cultivation in the United States.

BY J. W. COLCORD.

Of all the drugs in our materia medica, there is none, it can safely be said, so generally familiar, nor one so extensively used from remote antiquity (introduced as it has been, particularly during the past two centuries, into every portion of the civilized world), of which so little is positively known as the Chinese rhubarb. As to the particular species producing it, together with its habitat, culture, and preparation, even in the light of recent investigation—though many have previously claimed a settlement of these problems—much is conjecture, and the field is still a wide one for future discoveries, scarcely more than an entrance as yet having been made. That rhubarb, as exported from China, is produced from one species alone is not probable; and, in fact, all evidence obtainable would conclusively seem to prove the contrary. Soil and climatic influence, as also cultivation or non-cultivation, would be likely to present some variations of character in the same species.

The indications are, however, that the two species which have been introduced into Europe during the past decade, under the name of *Rheum officinale*, *Baillon* and *Rheum palmatum*, var. *tanguticum*, produce the larger portion; yet some other species, as yet undescribed, may still prove to be *the* one.

With this introduction, I will present a few of the principal features I have been able to gather with reference to the history of rhubarb as used medicinally.

* Read at the Fifth Session.

Unquestionably, it is indigenous to Mongolian soil, and the Chinese have been acquainted with its medicinal qualities, as known to us, from a very early date, authorities claiming that it was described by the Emperor Shen-nung, under the name Huang-liang, meaning "yellow-excellent," as far back as the year 2700 B. C. Dioscorides mentions a root under the name of "Rheon," which is considered to be identical with that known to us to-day. It is also mentioned in the fourth century under the name of Rha, which is supposed to be derived from the river Rha, or Volga of modern times, from whence the supplies were known to have been derived, having been transported overland from China, and brought down the Rha to some port near its mouth, and then distributed among the surrounding nations. Pliny also describes a root under the name Rhacoma, as being brought from beyond the Pontic, which will probably answer for rhubarb. It has been ascertained that Celsus alludes to Rha Pontica as indicating the source from whence it was known to him to be derived commercially. As early as the second century B. C., caravans from northern China are known to have arrived at Bokhara, and doubtless, among other things, brought rhubarb with them. The first mention that I find locating its cultivation with any degree of accuracy is by the Arabian geographer Edrisi, in the early part of the eleventh century, who speaks of it as growing in the mountains of Buthink, or northern Thibet. Mesue, an Arabian writer on medicine living about the same time, speaks of China rhubarb as superior to Turkey. In the twelfth century it was probably introduced by way of India, and it is enumerated in a tariff-list, among other drugs, at Acon in Syria. Marco Polo, the celebrated Venitian traveler, who was the first European who probably visited China, and whose writings were long considered mythical, until confirmed in the main by modern investigation, says that "he saw reobarbe growing in great profusion in the mountains and prairies of Cathay." Many other writers make frequent mention of it during the middle and succeeding ages. The exact time of its introduction into western Europe is uncertain, but the probabilities are that, like many other medicines, it owes its introduction to the Arabians.

The origin of the name rhubarb is a matter of conjecture only. It has been suggested that it may have been derived from the fact that the root, coming down the Rha to the Euxine, was first called Rha Pontic, while that coming down the Indus to the port of Barbarike, was designated Barbarike, or Barbarum, retaining the name Rha, by which it had previously been known. Under the name of Reu Barbarum, or Rheum Barbarum, it is mentioned in the writings of Trallianus in the sixth century, as also by other writers a century later. While thus known and described for so many centuries, it does not appear to have been used among western nations, except to a very limited extent, probably due largely to the great cost incident to its collection and preparation, and more particularly to

the cost of transportation which necessitated long and tedious journeys, with the attendant risk, loss and spoilation. As showing somewhat the value placed upon it in comparatively modern times, I find it quoted at Alexandria in 1407 as being worth twelve times as much as benzoin, a fabulous price, the latter requiring also an extended transportation from the East. In France, in 1542, I find it valued at ten times the price of cinnamon, another Eastern product held at a high figure. In 1614 it was held at twice the price of opium. In 1657, in England, opium was held at six shillings per pound, rhubarb at twelve. Turkey early became the rhubarb mart of the world, the London of to-day. This was received by various routes, at one time by way of the Volga and Euxine sea, again by the Volga, Caspian sea, and Persian gulf, or by the Indus to Alexandria, thence to Turkey. Later, it was brought by caravans, through Persia and Syria. Thus for centuries it was a source of considerable revenue to the Turkish government. In the latter part of the seventeenth century, Russia, awakening to renewed national life, concluded a treaty with China, by which the traffic was largely diverted from Turkey to her own domains, the route of transportation naturally being diverted further north, through Turkestan and the Caspian, to Moscow and St. Petersburg. the transportation through Persia growing gradually less, and finally ceasing altogether, though the name Turkey rhubarb, to some extent, has survived until the present time, often being called for under that name. In 1728 the treaty between Russia and China was still further enlarged, and depots and custom houses were established at Kiachta and Zuruchaitu, the former for over a century receiving a large proportion of that supplied to European markets. The traffic was placed under the control of a special bureau, with an apothecary at the head, and its supervision was exercised with unsparing severity. Poor and worthless roots were thrown out and destroyed, the rest pared, sliced and otherwise put in the best condition for transportation for its long and tedious journey, which took place but once a year, across the steppes to Moscow and St. Petersburg, to be deposited in the government warehouses. The great care exercised in its selection and preparation, as demanded by the government, made the Russian, or more familiarly known Crown rhubarb, one of the best, if not the best, ever seen in Europe. It can now only be found in cabinets, specimens near a century old being still in good sound condition. The supply thus obtained seldom exceeded 40,000 pounds per year, less than one half the amount necessary now to supply the annual requirements of the United States alone. As late as 1860, 6,000 pounds of rhubarb were burned at Kiachta, by the Russian government, upon the ground that the roots were too small.

After the opening of the treaty ports, on account of the greater ease by which it could be transported, as well as the opportunity afforded to avoid the rigid scrutiny of the Russian officials, no requirements being

R. officinale.

R. palmatum.

wherein will be noticed the characteristic differences between the two prominent species. The latest traveler, so far as I can learn, to penetrate into the rhubarb-producing country is Herr Frenzenbach, an interpreter to the German consulate at Shanghai, who, in 1880, leaving Peking, traveled northwesterly to Kalgan, thence proceeding due west, crossing the Yellow river twice, until finally reaching the province of Shensi, where he found large quantities of the plant growing. He was assured that the plants found there produced the rhubarb as sent to the seaboard for transportation. He states that these plants grow wild in great abundance on the mountain slopes and plateaus, in some places at an altitude of from three thousand to eight thousand feet above sea level. They were also cultivated to a large extent in the alluvial lands which are saturated with water only in spring. The temperature varies from 17° F. in winter to 90° in summer, with but little snow in winter. He brought back several living specimens representing the different varieties, one of which corresponds with the botanical description of *R. officinale*, Baillon. These have since been sent to Europe, but sufficient time has not yet elapsed to give the results. He confirms the reports of other travelers, that, like doctors, the Chinese seldom take their own medicines. I have frequently shown rhubarb to Chinamen here, and been surprised to find that they did not recognize it, and have, apparently truthfully, disclaimed all knowledge of it.

Within the past few months, as a result of the Tonquin war, the French have obtained a treaty with the Chinese government, permitting them, in pursuit of trade, to enter the province of Yunnan; and it is, therefore, not unlikely that we shall, at a not distant day, obtain more information on this interesting subject. Przewalski states that rhubarb is called by the Mongols *Sharmoti*, and by the Tangutians *Djumtsa*. But little beyond conjecture seems to be known as yet in respect to its preparation by the natives, although it doubtless varies in different localities. On the opening of spring, it finds its way from the various centres in the provinces, down the Yellow River to Hankow, where it is sorted and packed in chests, the larger portion being received in Shanghai for shipment. London is the largest purchaser, where, upon arrival, a large share is sold to be distributed in other countries.

As the characteristic, star-like markings and compactness which distinguish good specimens, as opposed to the sponginess of poor specimens, are supposed to be so familiar to every pharmacist, I pass it without alluding to it. Its grittiness when chewed, a ready test of its worth, is due to the presence of oxalate of calcium. The active principles of rhubarb have long been considered to lie in the yellowish-red medullary rays. Our knowledge of the active principles, to which is due its cathartic property, is somewhat meagre, but is undoubtedly due to the presence of chrysophanic acid and emodin. There is still a wide field open to the

student in investigation, ~~in respect to determining~~ the chemical constituents that give to rhubarb its therapeutic value.

Having given a few facts as to its history, and such information as could be imperfectly gathered as to its habitat, the question naturally arises: Can it be successfully grown elsewhere than in China?—the financial part of the problem being considered subsequently—the only demand being that a root shall be produced fully equal in all respects, therapeutically, to the rhubarb of commerce. Believing that a soil and climate analogous to that of the rhubarb-growing provinces of China could be found somewhere within the boundaries of the United States, I have devoted considerable time during the past two years to correspondence and research. Thanks to Mr. E. M. Holmes, of London, and Dr. Regel, of St. Petersburg, I have been enabled to gather much of the latest and most useful information in regard to European culture and preparation, and am now engaged in making a practical test, the results of which will remain undetermined for several years. In October, 1883, I obtained from Dr. Regel, through the Department of Agriculture, a liberal supply of seeds of *R. palmatum Tanguticum*, which, in his hands, would seem to have given good success. These seeds I have distributed to about one hundred and fifty different gentlemen, residing in different portions of the country, mostly physicians and pharmacists, who have been interested, and who have agreed, if successful in raising, to send root samples at the end of the third and fifth years. From several I have already heard good reports of growing plants. My first plants I unfortunately lost by an accident, thus putting me back several months; but have succeeded better since.

In regard to locality, though subject to future modifications, it would seem to me that some portions of New England, the mountainous districts of Virginia, West Virginia, East Tennessee, portions of New York, Pennsylvania, Colorado, and, above all, the upland Pacific slope among the mountains, offer prospects sufficient to warrant the attempt at cultivation. Experiments with reference to cultivation near the seaboard, in Europe, seem to prove that it can not be grown there successfully, it needing a higher inland altitude. Dr. Von Mecklin, who has for over thirty years examined drugs microscopically for the Russian government, has recently given an extended examination to roots of *R. palmatum Tanguticum*, grown in St. Petersburg, as also of roots of *R. officinale*, Baillon, grown at the same place. He states that five specimens were submitted to him, as follows: one five years old, *R. officinale*, grown in light loam; one *R. palmatum*, grown on sandy moorland; another, same species, five years old, grown in same soil, with two more same age and species, grown in clayey soil. For comparison, a good piece of the Chinese root was obtained from the government warehouse. Result: "All cultivated specimens differed from the trade product in containing

a larger amount of starch." "As they were taken from the ground," he continues, "at the time of mature vegetation, this store of starch is not to be considered as showing a different species. In the sample *R. officinale*, the amount of calcium oxalate, which in the trade specimens and in samples of *R. palmatum* form large druses of crystals, in good specimens often amounting to seven and one-half per cent., is extremely small. On a cross section it showed a whitish yellow; those of *palmatum* orange, orange red, to a rusty red. The specimens of *palmatum* nine years old, grown in light, sandy soil, resembled the trade product very nearly in color and marbled appearance, the others only in a slight degree. The smell and taste could not be exactly determined, since they were still fresh and moist. As to the amount of chrysophanic acid contained in the medullary sheath, all the samples differed from the trade product, in that they lacked the deep, dark, red orange contents of the good drug, even in the middle parts of the root, the number of the yellow cells appearing small in *R. officinale*, more in the younger *palmatum*, and richest in the older samples of the latter. The reaction with caustic potash upon the yellow substance of the medullary sheath of the older *palmatum*, gave an almost equally brilliant purple as the trade product; the *R. officinale* much less. After several hours' standing, the preparation, treated with caustic potash, showed perceptible isolated masses of the medullary sheath, which appeared strongly colored, and showed around themselves radial and bushy, thread-like, needle-shaped outlines, recalling crystals. Whether these formations are crystalline formations of chrysophanic acid, must remain for the present undetermined." In conclusion, he expresses the belief that a chemical analysis would determine the amount of chrysophanic acid in *R. palmatum* of suitable age and grown on proper soil, to be comparable with that of the best quality of the Chinese root. From Dr. Von Mecklin the roots were sent to Prof. Beilstein, the well known chemist, for analysis. "In making this analysis," he says, "due regard was had principally to determine the amount of chrysophanic acid and emodin they might contain. The roots were severally dried and powdered, and were then treated with benzol, and the dissolved matter purified by successive crystallization out of alcohol and aqueous acetic acid. The amount of emodin was so small that it could not be estimated with accuracy. From the older sample of *palmatum* was obtained 1 per cent. of chrysophanic acid, and about 0.3 per cent. of emodin. From the younger root of *palmatum*, grown in clayey soil, was obtained 0.5 per cent. chrysophanic acid, and a small amount of emodin;" the latter, as will be seen, corresponding with that of *R. officinale*. These examinations by Von Mecklin and Beilstein, the one microscopically, and the other by chemical analysis, would seem to show that *R. officinale*, grown under the same conditions, contains but one-half the amount of active principles of *R. palmatum*, thus rendering it

of little use therapeutically, should this result be confirmed by future investigators. Further, they show that roots grown in sandy moorland, well manured, contain twice as much active principle as that grown on clayey soil. From Dr. Regel, I gather the following suggestions in reference to cultivation: The soil should be dryly-situated moorland, preferably one with a substratum of sand. It should be well forked up from two to three feet in depth, and mixed with plenty of manure. The deeper the ground is turned up the better the plants will grow, and the stronger the roots will form. A small amount of clay, well mixed with the manure, and well worked in, is an advantage. Pure clayey soil appears to be unsuitable, the plants requiring a deep, rich humus, with loam or vegetable mould, and well manured.

Seeds should be sown in light, free soil, either in fall or spring, and covered somewhat lightly. The following fall or spring the seedlings should be transplanted carefully, about six inches to a foot apart, and in the third year in the fall, or fourth year in the spring, before sprouting, they should be again transplanted to the ground where they are finally to grow, and set out in rows from two and a half to three feet apart. In the spring and fall they can be kept free from weeds, and the ground loosened, either by hand or a horse extirpator. In the summer time the great leaves cover the ground to such an extent that no cultivation is needed. In from five to ten years they will have matured sufficiently to be marketable, investigation proving that the older the plant the richer in active principles. The only possible harvest time is in the fall, when the flower stalks are dried up, and the plant at rest; the spring time, when the root is awakening to renewed life, and the greater part of the active principle is more completely in solution, appearing entirely unsuitable. After removing the roots from the ground, they should be placed in a dry, warm room, spread on lathed frames, in order to secure complete rest and the gradual storing up of all reserved products. This should occupy from two to three months. After this the epidermis should be removed, and the root sliced, and the drying further completed by stringing, after the manner of drying apples in the country, and thus hung under cover till perfectly dried. Cold seems to have had no bad effect on the plants, Dr. Regel stating that in only one instance has any injury been done at St. Petersburg from this cause, and that on account of a late, heavy frost, after the plants had reached a foot in height, which killed some of the leaves, but they continued their growth as usual. A good dressing with stable manure in the fall, which should be carefully raked off in the spring, and turned under, would be all the protection needed in most instances. I have gathered many interesting items in connection with the subject, but due regard to condensing, as much as possible, in presenting this paper to your notice, forbids their mention. Any one desiring to experiment in cultivating these plants,

where proper soil is obtainable, can probably readily obtain seed by applying to the Department of Agriculture at Washington. Experiments, I think, should be made with the seeds of *R. officinale*, which as yet I have not been able to obtain, having applied several months ago. Experiments in Europe tend to show that they require an atmosphere more moist than dry. Given the proper soil, with a due regard to cultivation and preparation, I have no doubt but that rhubarb culture in this country can be made a success. Whether it would prove remunerative from a financial standpoint, would require repeated and long-continued experiments. My impression now is that it would.

ON ARTIFICIAL OIL OF GAULTHERIA.*

BY ADOLPH W. MILLER, M. D.

QUERY NO. 34.—*Good authority states that artificial salicylic acid is now used in making oil of wintergreen, and that this artificial oil is cheaper than the natural. To what extent is this true?*

This query may be very briefly answered in the negative. Inquiries and investigations pursued for the past year in various ways, among the most extensive and reliable dealers in essential oils, have failed to furnish the slightest evidence of the correctness of the above statement. It is quite true that the trade lists of several of the larger manufacturers quote "[Salicylate of Methyl," but it is always at an advance on the price of the oil of wintergreen. This salicylate of methyl is freely admitted to be artificially produced from wood alcohol and salicylic acid. The small demand which has sprung up for this article seems to be entirely due to the publication of a number of absurd formulæ for artificial flavoring extracts in Wood & Bache's Dispensatory, in which salicylate of methyl forms one of the numerous ingredients.

At the present high price of salicylic acid, and the comparatively low rate of oil of wintergreen, it would hardly pay to substitute the artificial for the natural product. It is not to be denied, however, that this obstacle would not prove to be a barrier to the industry in the hands of the firm which holds the monopoly of Kolbe's patent for making salicylic acid, as additional large amounts of this article could thus be disposed of. The price realized would no doubt afford a liberal profit to this firm, though it would be unremunerative to those who have to pay a heavy royalty on the manufacture of the acid. On the other hand, if the price of oil of wintergreen should at any time advance to about \$3, or over, this might prove to be a sufficient inducement for others also to substitute the chemical product for that of Nature.

* Read at the Fifth Session.

NOTE RELATIVE TO U. S. P. CINCHONA-ASSAY.*

BY EDWARD GÖEBEL.

Without wishing to criticise the Pharmacopœia, I desire to state my experience with the method, recommended by that work, for the assay of total alkaloids in cinchona bark. Having had occasion to examine a number of barks recently, I believe the officinal directions may be somewhat simplified and improved, without changing the chemical steps of the process, however. By strictly following the directions, viz.: "Treating 20 gms. of the powdered cinchona with milk of lime, drying, digesting with 200 cc. alcohol, transferring to a filter and percolating 200 cc. additional alcohol through the powder," I found that the residue in the funnel again treated with alcohol, the liquid filtered and evaporated, left a small quantity of very bitter extract.

Subsequently I proceeded as follows: "Place 15 gms. of cinchona—treated with milk of lime and perfectly dried—in a flask, add 150 cc. alcohol, weigh the whole, digest the loosely stoppered flask and contents for about two hours at 150°–160° F., cool, replace the slight loss of weight by alcohol, filter, through a covered filter, 100 cc. equivalent to 10 gms. of bark, and proceed with this extraction practically as directed by the Pharmacopœia." In this way, I think, greater accuracy is insured, besides its being a saving of time and alcohol.

This part of the pharmacopœial directions—"Distil or evaporate the filtrate to expel all the alcohol, cool, pass through a filter, and wash the latter with distilled water, slightly acidulated with diluted sulphuric acid, etc."—no one, certainly, would attempt to follow literally, for, after expelling the alcohol, there remains in the evaporating capsule but a small quantity of an extract-like mass, and the intent is, no doubt, to have this residue treated with acidulated water in the *capsule*, and this receptacle also carefully washed.

The precipitated and washed alkaloids are directed to be removed from the filter, transferred to a tared capsule, the filter washed with acidulated water, this liquid treated with solution of soda, any resulting precipitate collected on another small filter, and removed from this to the capsule in which the whole is to be dried. The removal from the filter is presumably directed on account of the low melting point of quinia, but, by drying the mixed alkaloids in the *tared filter*, merely a softening of the mass results without there being any danger of loss. In conclusion, I may mention that the barks examined ranged in alkaloid percentage from 5.700 down to 0.250, the former an E. I. red bark, the latter a sample of powdered so-called "yellow bark," and this, by the way, *not* the bark which I failed to exhaust by the officinal process of extraction.

LOUISVILLE, KY., *August, 1884.*

* Read at the Fifth Session.

ON OPIUM ASSAYS.*

BY WM. W. BARTLET.

QUERY No. 6.—*How does the present U. S. P. process for assaying opium compare with others as to accuracy in thoroughly exhausting the drug of morphine?*

The subject of the assay of opium has been so ably treated by Prof. Prescott, Dr. Squibb, and others, that there seems to be but little left to suggest or discuss. This is a very important subject to pharmacists, especially so to those who reside in States that have passed stringent adulteration acts. This has been brought home to the pharmacists of Massachusetts during the past winter, in a very substantial manner. The activity displayed by our efficient drug analyst has struck terror to the soul of the adulterer. It was found that opium and preparations of opium were persistently and systematically adulterated; that is, if the record of their analysis goes for anything. Thus, in the case of laudanum, which should assay at least 1.20 per cent. of morphine by the U. S. P. process, one assay showed that the laudanum had been adulterated to the extent of one third; another, one-half; and still another, very nearly three-quarters, showing that those engaged in this business were quite systematic in their operations. The processes selected as representing standard authorities, were those of the U. S. P., German Pharmacopœia, and British Pharmacopœia, my object being to ascertain which process most thoroughly exhausted the drug of morphine, or, in other words, which process produced the most morphine. I had simply to proceed to assay the opium by the three different methods, and compare the results.

Three samples of powdered opium were taken, and an assay made of each sample by each of the three processes, making nine assays in all. In using the U. S. P. process, I found that certain details which could not be properly put into the Pharmacopœia, were quite useful in carrying out its requirements. Thus, the freshly slaked lime should be in the powdered form. This can be done by using lime three parts, and water one part.

The quantity of slacked lime directed to be used is intended to be in excess, so that if a little more is used, there will be no harm done. Hence it can be weighed in a larger balance, if it is more convenient to do so.

Then the ammonium chloride is also in excess, and can also be weighed on a large balance, care being taken, however, to have at least the *full* quantity. The commercial ammonium chloride, in the form of crystal, was carefully powdered in a mortar each time; as the powdered ammonium chloride of the market should not be relied on for purity.

* Read at the Third Session.

Then the filter should be wet with ether before decanting the ethereal layer upon it, for it is the ether that we wish to pass through first, and thus hasten the process.

A fine glass rod was used to decant upon the filter. In decanting the ethereal layer, there is no absolute necessity for being particular to decant only the ethereal layer, for at least one-half the other liquid will be carried along with it in any event. I found it convenient, in washing the crystals with ether, to do so with a two cc. pipette.

After the crystals have been washed with ether, they need to be dried in the air only long enough to get rid of the ether, perhaps an hour. This is necessary, in order that the rest of the liquid, when added, will filter readily.

I have spoken of these points rather more in detail than I otherwise should, for the benefit of those who may have met with these difficulties, and have not clearly seen their way out of them.

The results of the three samples assayed by the U. S. P. process are as follows :

Number one,	12.50	per cent. of morphine.
" two,	12.48	" "
" three,	13.40	" "

The crystals were quite well defined, and quite light colored. Samples of opium No. 1 were quite dark ; samples Nos. 2 and 3 were quite light colored, which shows that the color of the opium is no guide to its morphine strength ; and, indeed, I have found that the physical appearances of powdered opium, as a rule, give no clue to its morphine value.

The result of the same three samples assayed by the process of the German Pharmacopœia are as follows :

Number one,	8.50	per cent. of morphine.
" two,	10.50	" "
" three,	9.25	" "

The crystals were quite light-colored, and somewhat larger than those produced by the U. S. P. process. This process is somewhat tedious, the liquids all being required to be weighed. The crystals of morphine were dried at between 70° C. and 80° C. till they ceased to lose weight, rather than at 100° C., in order to make sure that none of the morphine be lost. This process claims 10 per cent. of morphine.

The results of the same three samples assayed by the process of the British Pharmacopœia are as follows :

Number one,	5.12	per cent. of morphine.
" two,	8.25	" "
" three,	3.42	" "

This process seems to be somewhat indefinite. No temperature is men-

tioned at which the opium shall macerate. No temperature is mentioned for the remaining water that is to exhaust the opium. It speaks of concentrating to the bulk of one-half an ounce, but says nothing about the temperature at which this shall be done. It speaks of washing the precipitated morphine on a filter with cold water, but gives no limit. The morphine obtained by this process was quite dark colored, and it was difficult to find any crystals whatever. The morphine, in this case, was also dried at between 70° and 80° C., and not at 100° C., as directed by the process. Doubtless the new revision of the British Pharmacopœia will supply a much better method of assay. This process claims from 6 per cent. to 8 per cent. of morphine.

The morphine obtained in each case was shaken with one hundred parts of lime water, and in no case was in completely dissolved, but in each case very nearly so, and all to the same extent.

The morphine of the U. S. P. and German Pharmacopœia was quite light in color, the U. S. P. being quite as light as the German, and the British was quite dark.

It will be seen that the U. S. P. process calls for at least 12 per cent. of morphine, that the German calls for 10 per cent. morphine, and that the British calls for at least 6 per cent. of morphine, and that by actual experiment the U. S. P. process gave the largest yield, the German a much smaller yield, and the British the least of all.

That the morphine in each case dissolved to the same extent in lime water, and that the morphine obtained by the U. S. P. process was much lighter-colored than the British, and quite as light colored as the German, and gave a far larger yield than either of the other processes. The only inference that can be drawn from these results is that the present U. S. P. process is by far the most definite as to detail, yields by far the most morphine, and hence exhausts the opium more thoroughly than any of the other processes.

MINUTES

OF THE

THIRTY-SECOND ANNUAL MEETING.

FIRST SESSION.—TUESDAY AFTERNOON, AUGUST 26, 1884.

The American Pharmaceutical Association convened in its Thirty-second Annual Meeting in the hall of the West Side Turnverein, in the city of Milwaukee, Wisconsin. At 3:15 p. m., more than a quorum being present, President Thompson called the meeting to order and introduced Hon. Emil Walber, Mayor of Milwaukee.

MAYOR WALBER :—Gentlemen, it gives me great pleasure indeed, to welcome you to our city, and to extend to you its hospitality. While during the existence of your organization you have assembled in most of the largest cities of the union, and while some of them may excel in population, in wealth, or in business enterprise, I venture to say that in no place did the hearts of the citizens greet you with greater sincerity or with warmer cordiality than here in this city. Milwaukee, gentlemen, rejoices in meeting you, and stands ready to assist you in the work of promoting the objects of your Association. These objects, gentlemen, are of a higher order, and they touch upon our welfare, they concern and affect every family circle. Progress vast and remarkable has been made during the last century in the noble science of pharmacy, and you gentlemen who, by means of your Association, aim to still further improve the same, and seek to protect the public by detecting and exposing adulterations, are entitled to the respect and confidence of the community. It is through these associations like yours alone, that the arts and sciences can be made to produce the best results of knowledge and experience. The strength which lies in unity, the wisdom which comes from discussion of topics pertaining to your profession enable you to accomplish the noble end which you strive to attain. I trust, gentlemen, that you may enjoy the scientific and social features of your programme, and express the hope, which I know to be uppermost in the hearts of our people, that your stay among us may be agreeable, and that on your return to your homes you may carry with you the pleasant memories of your stay in our city, and of its inhabitants. (Applause.)

THE PRESIDENT :—Mr. Mayor, on behalf of my fellow members of the Association, I beg leave to say to you, sir, that we have listened with a great deal of pleasure and gratitude to the complimentary remarks with which you have welcomed our Association to your city. I feel quite sure, sir, that all of us who have entertained sanguine expectations in regard to the pleasure and success of this meeting, will feel doubly assured that they will be realized in listening to what you have so pleasantly said to us; and that those who have had any doubts as to the pleasure or success of this meeting will, I am sure have those doubts expelled. I shall not detain you by any long remarks on this

occasion. I beg leave to express to you on behalf of the American Pharmaceutical Association our very great thanks for the cordial manner in which you have extended a welcome to us; and also to the good people of this beautiful city of Milwaukee, which you have the honor to govern. (Applause).

The President then read his annual address.

FELLOW MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION :

Not least among the motives that bring us together in these annual meetings is the anticipated pleasure of renewing old friendships and forming new ones, and, while I extend to you all a cordial greeting on this occasion, I recognize the familiar faces of many whom it is my proud privilege to claim as friends.

Since we parted at Washington, gentlemen, I trust that time has dealt gently with you; that fortune has smiled upon you, and that you bring with you no cause for sorrow. To you I must candidly confess that the gratification of this moment is clouded by the consciousness of my unworthiness for the high office to which, through your partiality, I have been elevated. I must, therefore, appeal to your kind indulgence, and ask you to attribute any defects on my part rather to inability than to unwillingness to meet your just expectations of the presiding officer of this honored Association.

During the past year, pharmacists of this country have been greatly concerned in an effort to secure remunerative retail prices for what are known as proprietary medicines. The prominence which the agitation of this question has assumed, combined with its possible influence on pharmacy as a profession, renders some reference to the topic almost indispensable at this annual assemblage, not for the purpose of discussing the proposed methods for accomplishing fair prices in the sales of these articles, for that properly belongs to a kindred organization, but of considering the effect of this agitation on the future of pharmacy.

Turning back not a great many years, we find that the stock of the druggist was much more heterogeneous than it is at the present time. In the infancy of our country, the pioneers in our business found it necessary, in order to maintain themselves, to combine with the sale of medicines many articles of merchandise no longer kept in our stores, especially those in the larger cities. One by one most of those things that were foreign to medicine have been drawn from the drug store by the strong current of lower prices into other channels of trade. The process being gradual, the loss was not perceptibly felt, and can only be justly realized by a comparison of the stock in trade of a drug store of fifty years ago with that of a similar establishment of to-day.

The present question is of much greater import. It involves supplying the public with a particular class of medicines—proprietary or quack medicines, if you please, but nevertheless medicines—to those who consume them, the sale of which forms so large an item of the business of many druggists who can ill afford to lose the pecuniary advantages which they yield.

Without considering any of the temporary expedients suggested to relieve the situation, it is safe to say that the problem will ultimately be solved in one of two ways. 1st. By the pharmacist maintaining his present position as purveyor of this class of medicines, by furnishing them to the public as cheaply as can be done by any other branch of trade. To succeed in this will require a large increase in the volume of business transacted over the present average, in order to compensate for the diminished percentage of profit. Such an increase could not accrue to all of the stores. Only those best suited for the changed condition of things would get an enlarged business, while those not so fortunate would succumb to the inevitable. The survivors would be the gainers in commercial importance over their previous condition, and the mercantile character of our pursuit would dominate the professional.

2d. By the pharmacist abandoning the sale of these medicines, as he has done with other articles of merchandise, to those who may be willing to supply them at lower rates; and then confining himself, as he would be obliged to do, exclusively to the technical affairs of pharmacy. This would largely eliminate the present mercantile character of his occupation, and with it also a goodly share of his not too abundant income.

Like the other horn of the dilemma, this, too, would prove disastrous to a great number. Only those best qualified for the purely technical work of pharmacy would succeed. The result might not show so well financially as the former, but would have a most decided effect in elevating pharmacy to that higher plane where so many of our most devoted and unselfish members desire to see it firmly placed. Taking either view of the case, the same conclusion must be reached, that the chief evil of the situation is the superabundance of drug stores, more of which, it must be conceded, are in operation than can be profitably maintained either on a mercantile or professional basis—an evil that assuredly tends to perpetuate itself. The proprietor of the unprofitable store being unable to fairly compensate the clerk he has educated to the business, forces him to increase the number of stores by opening a competing one, and thus to again divide the molecule of profit until it is reduced to atoms.

But, after all, are we not justified in the belief that from the present trade conflict there will survive a higher pharmacy than that of our time? We are sustained in this opinion by a survey of the entire situation of pharmacy in this country. Every year adds to the number of laws enacted by our States for the purpose of protecting the competently qualified pharmacist in the pursuit of his profession, and of guarding the public against the dangers attending the dispensing of medicines by persons without the necessary training to fit them for such responsible duties. The colleges of pharmacy are increasing in numbers; their registers show larger attendance; their curriculum is becoming more thorough and systematic; their standard for graduation is being raised higher and higher; pharmaceutical journals have more than doubled, both in numbers and circulation, within the past few years; associations for mutual improvement by the exchange of thought are springing up in towns, counties, and States; all of which bear ample evidence that in the grand march of progress—characteristic of our century in all that pertains to science and art—our profession will not lag behind, but her followers, fully equipped with knowledge and skill, will stand shoulder to shoulder with the most advanced; and with equal strides will move on to that brighter era for which they appear to be preparing.

The very late appearance of our published Proceedings of 1883, the volume not having been delivered until the second week in July, must have seriously taxed the patience of those anxiously awaiting it. The causes for this unusual delay are small and trifling, but so numerous as to have consumed a great deal of time. Some were accidental, and quite all were unavoidable. You may, however, be assured that your committee, having the publication in charge, were equally as anxious to finish and deliver the book as you were to receive it, and did all that circumstances would permit to facilitate the work. So great a delay is not likely to occur again. If, however, any member can suggest a plan that will expedite the publication, the committee in charge of this particular subject will, I venture to say, cheerfully adopt it.

While forced in this instance to rely on your indulgence, it is not intended that your pardon for the delay shall be accepted as an abatement of your desire to be more promptly served in the future.

In looking into the publication of our Proceedings, I obtained some knowledge of the labor required to conduct the affairs of an association like our own, and especially of that which devolves on the Permanent Secretary, who, in addition to the ordinary duties of his position, edits the Proceedings and arranges the manuscript for the printer. A

great part of this work is of the most tedious and uninteresting character. Now, while the Association requires that its work shall be well and promptly done, I am sure it also intends that the services of its faithful officers shall be fairly remunerated, if the means at our command will allow. Believing our resources to be such as to permit another step towards the desirable goal of adequate compensation, I would recommend that the salary of the Permanent Secretary be increased to \$750. To this end an amendment of Art. I., Chap. II. of the By-Laws, will be necessary.

The condition imposed on the recipient of a certificate of membership to return the same to the proper officer on relinquishing connection with the Association, does not appear to be reasonable or fair. When we consider that the certificate is merely the statement of an accomplished fact, namely, that on blank date, A. B. was elected a member of the Association, a fact not to be invalidated by subsequent events, not even by his resignation, death, or expulsion, we are at a loss for the reason for this condition. The certificate entitles the owner to no privileges; it possesses no commercial value; to all but him whose name it recites and those immediately interested in him, it is a piece of waste paper. The minutes, as published in the Proceedings, bear testimony to the fact of his election to membership, which is there reiterated annually, and to thousands, while the certificate is issued but once, and is read only by the owner and his friends. He acquires his title to it by election to membership, which he consummates on the payment of the required fee, and should be allowed to retain possession of it despite relinquishing connection with the Association. It is not surprising that this condition should be so lightly regarded by those ceasing to be members, and that such a small number of certificates are returned. Because this requirement appears to be unfair to our members, it is recommended that it be abolished by striking out so much of Article VII., Chapter VIII., as demands the return of the certificate.

The reports of your officers and committees, with the minutes of the Council, will fully acquaint you with the transactions of the Association during the past year, and will, in addition, show its affairs to be in a prosperous state.

The efforts of the Committee on Papers and Queries to stimulate interest in the important branch entrusted to them, by issuing a printed circular setting forth their objects, are noted with pleasure, and I trust may have the success they desire.

It is a matter of regret that special funds held by the Association for the purpose of encouraging investigation and developing new processes have not been more instrumental in stimulating work in these channels.

The first of these, known as the Ebert prize fund, was donated by our worthy ex-president, whose name it bears, at the meeting held in Richmond, in 1873, just eleven years ago. The Association immediately proceeded to execute the design of the generous donor by the appointment of a "Committee on Prize Essays," and the promulgation of the conditions governing the award. Since that time the committee have recommended and adopted various suggestions with the view of creating a desire among the workers in pharmaceutical research to secure this prize, as an evidence of their successful experiments. Notwithstanding these endeavors, we find that since the prize was first instituted it has been awarded but three times—first, in 1875, to Mr. Chas. L. Mitchell; second, in 1878, to Mr. Frederick B. Power; and lastly, in 1883, to Mr. J. U. Lloyd. These gentlemen are to be congratulated on their success where so many have failed to reach the standard of excellence required of the fortunate recipient of this award by the committee. It is doubtless true that the rarity of its bestowal enhances its value to those who worthily receive it, yet, without wishing to detract from their well-won honors, it would be highly gratifying to us all, and I venture to say especially pleasing to its originator, to have the Ebert prize successfully claimed annually by some of our estimable co-laborers.

The Centennial Fund, the result of the overflowing liberality of our fellows in Philadelphia, at the meeting held there in 1876, was instituted with a view of defraying the expense of material used by experimenters doing original work, thus very happily supplementing the design of the Ebert prize. Whether from unwillingness on the part of those it was intended to assist to accept its bounty, or that the value of the material consumed was too insignificant to make a demand, no application for any portion of the available fund has thus far been made.

The Committee on Prize Essays appear to have done all that is possible to excite interest in this subject, and the Committee on the Centennial Fund annually advertise its existence, and the conditions of its disposal. These committees, in fact, have left nothing for me to suggest to promote the original objects of these funds, unless the mention here made of them should serve to attract the attention and induce emulation on the part of some of our numerous investigators in this fruitful field of scientific research.

The present membership of the Association may in round numbers be stated at 1,500 ninety-six new names having been added at our last meeting. While we find considerable encouragement in this gradual increase, we cannot deny that our roll is still far short of what we might reasonably expect. Of the 15,000 to 20,000 eligible pharmacists in the United States, this Association, after an existence of thirty-two years, embraces only from 8 to 10 per centum of the entire number. Instead of this meagre fraction of the whole, we should have reached 20 to 25 per centum, or say 5,000 members. Aside from the financial aid and consequent reduction of annual dues, such a roll of members would add great moral weight to the influence of the Association in accomplishing its objects. The beneficent influences of our organization are disseminated through its units, and like the law of gravitation it is exerted with equal force, without loss of power, on each member of the system.

The labor of managing the affairs of this Association with 5,000 members would be but slightly increased over what is now required for 1,500.

Every effort should be made, both by the Association and its individual members, for the acquisition of new material to our ranks. The most important step in this direction would undoubtedly be a reduction in the annual dues, but as this is not deemed expedient at present, it is recommended, as the next best move, that the initiation fee be at once abolished.

To a great many the difference between \$10 and \$5, as the cost of joining the Association, would not be of sufficient import to influence them; many others, however, who are kindly disposed towards us, yet count the cost of becoming members, might by this reduction be induced to place their names upon our rolls. The reduction certainly would not prevent any one from applying for membership, but, on the contrary it is believed, would add largely to our numbers. If the proposed change would increase our applications for membership twenty per centum, even over our present average, at the end of five years our income would from this source make good the loss of the initiation fee, and we would thenceforth steadily gain, both in members and means. We could then say to our fellow pharmacists, come, join us, we charge you nothing for the privilege of uniting with us.

Should this recommendation meet your approval, it will be necessary to amend Art. III, Chap. VIII of the By-Laws by striking out the words "an initiation fee," and changing the plural "sums" to the singular.

The success of our organization has been highly gratifying. Every year adds to our prestige, to our number, to our influence, and to our capacity for using these forces. The power of the Association is a solemn trust in the hands of those who for the time direct its affairs, and they should so apply its energies that the practical results accruing to its constituents shall be commensurate with the means at their command. That we

have cause for congratulation for what has been accomplished is fully established by the character and extent of the information annually placed before us in the Proceedings, whose pages bear evidence of many liberal minds, controlled by willing hearts, that have cheerfully spread the fruit of their toilsome hours before us as a free offering on our common altar, that all who desire may partake thereof.

There is, however, a principal feature of our original cause for existence which appears to have been neglected. It forms the first paragraph of our Constitution, and reads: "To improve and regulate the drug market by preventing the importation of inferior, adulterated, and deteriorated drugs, and by detecting and exposing home adulterations."

This very properly stands as the first and chiefest object sought to be attained by its founders through the means of this organization. We got this by inheritance from the colleges of pharmacy, whose offspring we are. At that time the great evil complained of was the inferior quality of the drugs imported from Europe, from whence most of them were then procured. To correct this evil the New York College of Pharmacy called a convention of delegates from other similar colleges to meet in New York city, on October 15, 1851, "for the purpose of adopting a series of standards for use by the special examiners at our ports, whereby their action might be rendered more uniform and satisfactory." Before adjourning they ordered the call of a convention in Philadelphia, in the following year, which resulted in the formation of the American Pharmaceutical Association. This scrap of history is given to show how clearly the motives that influenced the founders of our Association are reflected in the first paragraph of its Constitution, just quoted.

To guard the purity of the medicines he dispenses is the pre-eminent duty of the pharmacist. When the physician ceased to be his own apothecary and relegated that part of his profession to another, he imposed on the pharmacist who accepted its performance, the sacred responsibility of providing the needed remedies in such a condition of purity that their effects on the human system might be fairly predicated. Without this security the application of medicines by the physician must be the blindest sort of experimenting. What but disappointment, or, perhaps, worse, must ensue when the physician, prescribing a drug in such doses as the posological tables give, is supplied with an inferior quality to the standard? How great a share of the differences in the posological tables of different authors may be due to the variable quality of the medicines employed? How misleading it must be to the inexperienced practitioner of medicine who, ordering for the first time a purgative dose of rhubarb, is so unfortunate as to have his patient supplied with some of the powder sold by that name, spoken of by Mr. Allaire at our meeting in 1882? What does the science of medicine gain by the chemist's discovery of new active principles or alkaloids, if they are to be supplied in so inferior quality and variable activity as is aconitine? The physician rightly holds the pharmacist responsible for the quality of the medicines he uses. It is an obligation we are bound honestly to observe; otherwise, our practices may become worse than shams—criminal frauds. And if we are responsible for the quality of the ingredients dispensed on prescriptions to the prescriber, who may be able to protect himself by the timely detection of fraud, how much greater is our obligation to the layman we serve, who, being without the technical knowledge of the properties of medicines, depends entirely on the integrity and skill of the pharmacist?

To conscientiously execute this important duty, it might be said that the pharmacist should critically inspect each drug and test each chemical as it comes into his store. And so he should, so far as his ability and time will permit; but these drugs and chemicals are so numerous, and many of them need to be kept fresh by so frequent and small purchases, that ordinarily such complete inspection and testing became an impossibility.

In his honest efforts to perform this duty he may use all practical methods within his reach ; and this Association is one of the means he may employ for that object. As we have shown, it was organized for this purpose more than aught else. As the agent of its members, operating in the detection and prevention of adulterations and impurities, it is doing effectually for all what each would be required to do for himself ; and in no other way can this Association so justly earn the esteem and command the respect of its members as by using its power to eradicate abuses of adulteration and impurity from the drug market.

By way of comparison, allow me to make a quotation showing the condition of the drug market prior to the date of our organization, and to follow it with one on the same subject lately made.

The " Boston Traveller " of May, 1848, notes the sale in Boston of twenty cases of opium, all apparently of the same lot, which sold at prices varying from \$3.45 a pound to 3 cents a pound. Dr. M. J. Bailey, the inspector of drugs at the New York custom-house, reports in 1848 that a lot of opium passed the custom-house of that city so adulterated with starchy and saccharine matters as to be literally alive with worms, and that more than one-half of many of the most important chemical and medicinal preparations, together with large quantities of crude drugs, come to us so much adulterated or otherwise deteriorated as to render them not only worthless as medicines, but often dangerous. It should be mentioned that the duty of the inspectors of drugs at that time was merely to protect the government against the fraudulent valuation of such drugs as were dutiable under the law.

Four years ago Prof. C. Lewis Diehl made a very full report to the National Board of Health on the deteriorations, adulterations, and substitutions of drugs, in which he tabulated 212 of the most important of them, naming their source, cause of inferiority, and commercial quality. One hundred and twenty of them were exclusively foreign, 92 of which were designated as good or fair in quality, and 28 variable. The condition of the drug market he pronounced unqualifiedly fair. It cannot be denied that this very great improvement is largely due to the exposure by this Association of adulterations, and its influence in cultivating a proper appreciation of the importance of maintaining uniform standards of quality in medicines by the promulgation of correct information on these subjects.

Somehow, the Committee on Adulterations appear not to have given entire satisfaction, and their failure occasionally to make annual reports lead to a recommendation by President C. Lewis Diehl, in 1875, that they be dropped, which was done in 1877. What was expected of the committee at that time was that they should report at the annual meetings such adulterations or sophistications as might come under their notice, and it may be readily seen that unless they were actively engaged in the examination of such drugs as were on the market the subject matter for the annual report must be very meagre, or must be made up from the cases noted in the journals. It was inevitable that such a scheme would become a failure, for the simple but cogent reason that it was not adjusted to the character of the work to be done. To rid the market of drugs unsuited for medicinal use is no small task ; of course, it will never be completely done ; but then some system should be devised by which it will be as easy to procure drugs fully up to the pharmacopœial standard as it is to obtain them below it.

The Committee on Adulterations was not dropped because there were no inferior drugs on the market ; they were on sale then, and are now.

I wish distinctly to disown any intention of reflecting on the integrity of any particular person or firm, when I state that houses of high commercial standing are to-day selling drugs which are not fully up to the standard—are, in other words, not what they are represented to be. This is very largely due to a want of exactness that is allowed to exist in

this particular by commercial custom, for which the retailer is quite as censurable in submitting to as the large dealer, who supplies him, is in availing himself of it. The manufacturer who sells ammonia water containing but 8 per centum of gaseous ammonia as 10 per centum would scorn to deliver 8 pounds of the same material and receive pay for 10, and the retailer who would submit to such an imposition would deem himself an encourager of the fraud. Morally there can be no difference between the two cases; yet one is sanctioned by commercial usage, while the other is condemned. If this sort of laxity is allowed to pass unchallenged on so low-priced an article as ammonia water, what an extent of variation from the correct standard may we expect when the transaction concerns some of the very expensive drugs? To break up and destroy such vicious customs as these is the legitimate duty of this Association, and because it has failed to bring them to light and condemnation by one method, is not sufficient cause for abandoning the attempt and not trying others.

The pharmacist who is informed as to the variability in the quality of the medicine, and realizes the importance of maintaining their standard of purity will, in making his purchases, demand to be supplied only with such as are of known quality, unless he dishonestly seeks additional profit by buying inferior drugs at low prices and disposing of them as "strictly pure" at high rates. I feel quite sure I do not address any of the latter class here. They are not of the kind that become members of the American Pharmaceutical Association, for they would find nothing either in its practices or purposes at all congenial to their tastes. The demand for standard medicines by the retailer will surely be met by a supply from the wholesaler, most of whom would be quite as willing, if not more so, to deal in goods entirely honest as in those that fail to meet that qualification.

This Association should continue in the work of disseminating information as to the quality of drugs, and, by exposing adulterations and impurities, seek to prevent them. For the execution of this object your attention is respectfully invited to the following scheme:

1st. To authorize the Council to appoint a committee of three, residents of the same city, to be known as the Committee on Adulterations and Impurities.

2d. Said Committee shall appoint corresponding members, whose duty it shall be to report to the Committee any inferior drug coming under their notice.

3d. The Committee shall cause to be made chemical and microscopical examinations each year of a portion of the drugs on the market, especially such as they may suspect of inferiority, and for this purpose they be authorized to employ such experts as they may select, to be paid out of the funds of the Association, provided the annual expense shall not exceed five hundred dollars.

4th. When the name of the maker or vender of an inferior drug is known to the Committee, they shall send him a written statement of the examination, and direct his attention to the cause of inferiority. If after this notice he still persists in offering said inferior article, the Committee shall report his name to the Association, at its next annual meeting, for publication.

5th. The Committee shall quarterly furnish the Pharmaceutical journals, for publication, such a synopsis of their work as may be of service to the members of this Association. Should the journals decline to publish it, the Committee shall have it printed and mailed to the members. They shall also make a complete report at each annual meeting.

It may be objected to this scheme, that, if faithfully executed, it will virtually be an inspection of drugs, which ought to be done by the State, and at its expense. Possibly this may be usurping the functions of the State; but, if so, it is a function that has been very sadly neglected. We know exactly what is needed, and have the men competent to perform the duty. Then, why should we not try to assist ourselves, rather than wait

the tardy movement of a cumbrous political machine, that is quite as likely to disappoint us in its results as otherwise?

Again, no better means than this Committee could be devised to establish or disprove the necessity of State inspection of drugs. The facts thus gathered in a few years would furnish the very best evidence in this direction. Another advantage to be anticipated from the practical work of the Committee will be the just criticism their reports would furnish on the standards and tests of our Pharmacopœia, which would be found very serviceable in its future revisions.

I have endeavored, gentlemen, thus imperfectly to lay before you the fact of the existence of inferior drugs on the market, the necessity for and the best means of correcting the evil, to show the duty of the Association as an organized body, and the obligations of its units in the premises; to point out some of the benefits likely to accrue should the scheme be adopted; and now, finally, I submit the whole subject, together with the other matters referred to in this address, to your kind consideration and wiser judgment.

Trusting that our deliberations may be mutually advantageous; that the results of this meeting may reflect credit on the skill and zeal of those here assembled; that each of you may realize the hopes entertained for this occasion, and carry hence none but pleasant memories, I thank you for your kind and courteous attention.

On motion of Mr. Remington, a committee of three was directed to be appointed to take into consideration the recommendations made in the President's address, and to report thereon at a subsequent session.

The reading of the roll was, on motion, dispensed with.

On motion of Mr. Menninger, an invitation was extended to the members of the medical and pharmaceutical professions, who may be present in the city, to attend the sessions.

The exhibition room being located directly above the meeting room, and considerable noise being made by walking on the upper floor, Mr. Ebert moved that the exhibition room be closed during the sessions of the Association.

Mr. Menninger offered the amendment that the exhibition room be closed during the subsequent sessions. The amendment was accepted by Mr. Ebert, and the motion, as amended, was adopted.

The Secretary now read the list of delegates appointed to attend this meeting, showing that delegations had been appointed as follows:

From Colleges of Pharmacy.—Chicago, Cincinnati, Louisville, Massachusetts, National (Washington, D. C.), New York, Ontario, Philadelphia, and St. Louis.

From Alumni Associations of Colleges of Pharmacy.—Albany, Louisville, Massachusetts, Philadelphia, and St. Louis.

From State Pharmaceutical Associations.—Connecticut, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Mississippi, Nebraska, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Texas, Virginia, West Virginia, and Wisconsin.

From County and Other Local Pharmaceutical Associations.—Cleveland, O.; Davenport, Ia.; Detroit, Mich.; Indianapolis, Ind.; Kings county, N. Y.; Lancaster county, Pa.; Lynn, Mass.; New Orleans, La.; Richmond, Va.; and St. Joseph county, Ind.

(For the names of delegates present at the meeting see list of members in attendance, p. 21.)

Mr. Kennedy, Secretary of the Council, read the names of sixteen candidates for membership, who had complied with the requirements of the By-Laws.

The following committees presented reports which were laid upon the table for future action: Committee on the Drug Market, Committee on Prize Essays, Committee on Legislation, Committee on the Proposed Meeting in California, Committee on Unofficinal Formulas, and Committee on Entertainment.

The different delegations made the following selections from among their number to serve on the Nominating Committee:

COLLEGES OF PHARMACY.

Chicago.—T. H. Patterson.
Cincinnati.—J. D. Wells.
Louisville.—H. H. Rademaker.
Massachusetts.—Joel S. Orne.

National (Washington, D. C.).—W. H. Bergman.
New York.—G. J. Seabury.
Philadelphia.—A. Robbins.
St. Louis.—J. M. Good.

ALUMNI ASSOCIATIONS.

Albany.—L. H. Wheeler.
Massachusetts.—W. W. Bartlet.

Philadelphia.—A. Conrath.
St. Louis.—F. A. Hassebrock.

STATE ASSOCIATIONS.

Georgia.—J. Ingalls.
Illinois.—A. E. Ebert.
Indiana.—W. C. Buntin.
Iowa.—G. H. Schafer.
Kansas.—R. J. Brown.
Kentucky.—C. L. Diehl.
Massachusetts.—H. Canning.
Michigan.—Geo. Macdonald.
Mississippi.—J. W. Eckford.
Nebraska.—N. A. Kuhn.

New Hampshire.—C. A. Tufts.
New Jersey.—E. A. Sayre.
New York.—T. J. Macmahan.
Ohio.—F. W. Herbst.
Pennsylvania.—C. A. Heinitsh.
Rhode Island.—H. J. Alfreds.
Texas.—E. W. Lancaster.
West Virginia.—E. Bocking.
Wisconsin.—J. A. Dadd.

COUNTY AND OTHER LOCAL ASSOCIATIONS.

Cleveland, O.—A. Mayell.
Davenport, Ia.—J. H. Harrison.
Detroit, Mich.—J. W. Caldwell.
Indianapolis.—G. W. Sloan.

Kings Co., N. Y.—J. G. Underhill.
Lancaster Co., Pa.—C. A. Heinitsh.
Lynn, Mass.—J. W. Colcord.
St. Joseph Co., Ind.—Leo Eliel.

On motion of Mr. Sloan, Mr. P. C. Candidus was received as a delegate from the Alabama Pharmaceutical Association; and, on motion of Mr. Macmahan, Mr. T. F. Main was added to the delegates as the representative of the Alumni Association of the College of Pharmacy of the city of New York.

The President appointed the following five members from the Association at large, to serve on the Nominating Committee: A. Nattans, Washington, D. C.; F. W. Sennewald, St. Louis; J. C. Huber, Fond du Lac, Wis.; W. P. Plummer, Bradford, Ill.; and Jacob Jesson, Muskegon, Mich.

The Secretary of the Council read the Minutes of the sessions of that body, held since the last annual meeting. These minutes were, on motion, approved.

These minutes give the information that since the adjournment of the Thirty-first Annual Meeting the Council has held four sessions, one at Washington, Sept. 14, 1883; one at Philadelphia, Dec. 3, 1863; and two at Milwaukee, August 25 and 26, 1884.

COUNCIL MEETING, December 3, 1883. (8 members present.)

Mr. J. R. Drake, having resigned from the office of Local Secretary, to which he was elected at Washington, Mr. Henry C. Schranck was elected to serve as Local Secretary for the thirty-second meeting.

In relation to Mr. J. W. Colcord's motion (see Proceedings, 1883, p. 446), that an appropriation of \$25,000 for the Agricultural Bureau be asked from the general government, the following, offered by Mr. Thompson, was adopted:

Resolved, That a memorial be prepared and signed by the officers of the Association, and presented to Congress, asking in the name of the members of the American Pharmaceutical Association that the Commissioner of Agriculture be directed to institute such experiments on the introduction of foreign medicinal plants as will determine which of these plants may be profitably cultivated within the limits of the United States.

Mr. Vogeler's motion (see Proceedings 1883, p. 472), that suitable inexpensive badges be provided for all members in attendance at the annual meetings, was ordered to be carried out.

The suggestions made in the annual address of President Heinitsh, which were referred to the Council (see Proceedings, 1883, p. 470), were acted upon as follows:

1. The Committee on Membership is a standing committee of the Council. A sum not exceeding \$125 was placed at its disposal for the printing of circulars and application blanks.

2. The meeting of the International Pharmaceutical Congress having been postponed until 1885, no action was necessary.

3. The subject of the sale of condemned drugs and medicines by the government was referred to a Committee consisting of Messrs. Chas. Rice, S. A. D. Sheppard, J. P. Remington, W. S. Thompson and E. W. Runyon, to report at a subsequent session.

The Council elected the following committees to make arrangements for the present meeting: Railroad Committee, T. J. Macmahan, the Local Secretary and the Permanent Secretary; Entertainment Committee, J. L. Lemberger, H. J. Menninger and the Local Secretary. The price of entertainment tickets was fixed at \$3.

The Treasurer was authorized to renew at the usual cost, certificates which may have been lost, provided they be marked "duplicate" in red letters.

The chairman of Council appointed Messrs. S. A. D. Sheppard, Henry Canning and L. D. Drury a committee to examine the Treasurer's books.

COUNCIL MEETINGS, August 25 and 26, 1884. (12 members present.)

The report of the committee appointed to examine the Treasurer's books was received, the suggestions made therein discussed, and then referred to the treasurer and finance committee to report at a future session of the Council.

The report by Mr. Chas. Rice on behalf of the committee on the sale of condemned drugs by the government, was accepted and referred to the Association.

Mr. Thompson reported that he had visited the Commissioner of Agriculture in regard to the proposed appropriation by Congress, and that the Commissioner had expressed his willingness to assist without special approbation, in carrying out the objects of the resolution offered by Mr. J. W. Colcord, if a list of plants was furnished for making the suggested experiments of cultivation. The subject was for the present laid upon the table.

The Permanent Secretary reported that the three albums belonging to the Association were now in his possession.

Messrs. C. L. Diehl, H. J. Menninger, and W. J. M. Gordon were appointed a committee to have the custody of papers read at the present meeting.

Mr. Chas. W. Grassly, of Chicago, having retracted a letter written to the Association in 1873, his application for membership was referred to the proper committee.

The names of Messrs. Chas. H. Fisk and Chas. W. Day, of Chicago, were restored to the list of members, with the right to the Proceedings of the present meeting.

Applications from 16 candidates for membership were examined, and were ordered to be reported to the Association. The same course was taken with the reports of the Committee on Membership, the Publication Committee, and the report on credentials by the Permanent Secretary.

The report on credentials has been given above (page 486); the other reports referred to in the Minutes of the Council and acted upon are as follows:

REPORT OF THE COMMITTEE ON MEMBERSHIP.

TO THE COUNCIL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

The Committee on Membership respectfully present the following:

REPORT OF MEMBERSHIP.	
Members in good standing at last report	1382
Members elected at last meeting	86
Delegates who became members by signing the Constitution and By-Laws . .	4
	<hr/>
Making a total membership of	1472

LOSS IN MEMBERSHIP.	
By resignation	16
Dropped from the roll for various causes	67
By death	12
	<hr/>
Total loss	95
	<hr/>
Number in good standing at this report	1377

HONORARY MEMBERSHIP.	
Number at last report	30
Elected at last meeting	0
	<hr/>
Total	30
Loss by death	1
	<hr/>
Balance at this date	29

In obedience to instructions from the Council, your Committee sent out 6,000 circulars and blank applications to pharmacists residing in the States of Wisconsin, Minnesota, Michigan, Illinois, Iowa, Kansas, and Nebraska. The expense to the Association was as follows:

Printing circulars, applications, and envelopes.	\$47 50
Postage	60 00
Addresses	5 00
	<hr/>
Total.	\$112 50

The circular was the same as last year, with a few changes.
The applications which have been received will be reported at the proper time.

At this time many members are liable to be dropped for non-payment of dues, but it is hoped that most of these will pay up their arrearages before the next volume of the Proceedings is published. I have also to report that twenty-three former members of the Association, who have severed their connection, have not returned their certificates of membership.

I have yet the sad and solemn duty to perform of announcing to the Association the names of those members who have been taken from us by death. Several of these are on the list of deceased members published in last Proceedings. Wm. R. Wright, Boston, Mass.; Albert Adolph, Columbus, Ohio; Theobald Frohwein, New York City; J. F. D. Lobstein, Sag Harbor, N. Y.; Henry A. Tilden, New Lebanon, N. Y.; W. H. Hardy, Clinton, Iowa; Paul F. Lehlbach, New York City; Howard S. Betts, Norwalk, Conn.; Edward H. Marsh, New York City; Augustus W. Weismann, New York City; Joseph C. Hair, Wilkesbarre, Pa.; J. Lewis Hunt, Hingham, Mass; Peter Squire, London, England.

Wm. R. Wright, of Boston, Mass., died in his native city, of angina pectoris, after a few hours' sickness. Mr. Wright was born in Boston, January 13, 1821, and was, consequently, in the sixty-fourth year of his age. He studied pharmacy in Boston, and was considered well skilled in his profession. In 1854, he went into business for himself, and continued without interruption up to the time of his death, making a period of nearly thirty years. He was the senior member of the firm of Wm. R. Wright & Son. He held several positions of trust and honor, and was highly respected in the community in which he lived. A wife and three children are left to mourn the loss of a loving husband and an affectionate father. He became a member of our Association at the meeting held in the city of Boston, 1875.

Albert Adolph, of Columbus, Ohio, died there November 7th, 1883, of typhoid fever, after a week's illness. The deceased was born in Schopshheim, Baden, Germany, July 4th, 1856, and at the time of his death was twenty-seven years of age. He served as a drug clerk in Sandusky and Cincinnati, Ohio, and from the latter place moved to Columbus, Ohio, in 1879, going into business on his own account, which he conducted with good prosperity. Mr. Adolph was considered a very conscientious and upright man in all his business transactions. Deceased became a member of our Association at the meeting held at Niagara Falls in 1882.

Theobald Frohwein, of New York city, died there in November last. Mr. Frohwein graduated from the New York College of Pharmacy in 1863, and succeeded his former employer in the business. He identified himself in every way to advance the interest not only of the New York College of Pharmacy, but of the profession generally. With a few others, he joined heartily in the project of forming the Alumni Association of the New York College of Pharmacy, and for a number of years was its treasurer, and always one of its heartiest supporters. For a long period he served as treasurer of the New York College of Pharmacy, and as a member of its board of trustees. When the Board of Pharmacy was first organized in the city of New York in 1870, he was appointed by the Governor one of its members, and continued to serve until the time of his demise. He was greatly respected, stood very high in his profession, and was one of the most generous of friends, and many will miss his genial counsel and sound advice. He was honored with several important positions of trust, in which he gave entire satisfaction. The deceased was elected a member of this Association in Philadelphia in 1862.

J. F. D. Lobstein, of Sag Harbor, New York, died there, January 22, 1884, of pneumonia. For many years he had been in business at Sag Harbor, and was respected by all who knew him. He was quiet and unobtrusive in his ways, attached to his family, conscientious in his business relations, and seldom went into other spheres, though taking interest in these by membership and in other ways. The deceased was a member of the

New York College of Pharmacy and the New York State Pharmaceutical Association, In 1868, in the city of Philadelphia, he was elected a member of our Association.

Henry A. Tilden, of New Lebanon, New York, died in his native place, at the family residence, March 12, 1884, after an illness lasting several weeks. The illness was caused by an affection of the heart, complicated by a trouble with the kidneys. The deceased was born in New Lebanon, on April 1, 1821. He was educated at New Lebanon and at Lenox, Mass. His business career was begun in the well-known pharmaceutical manufactory founded by his father, whom, in 1848, the son succeeded in charge of the establishment, remaining in that position until 1879, when he retired. His activity as a business man was such as brought him to the knowledge and observation of many people. His circle of acquaintances and friends was large, and his cheerfulness, sagacity, humor and hospitality were constantly augmenting the circle. In 1852, he was married to Miss Susan Gould, of Rochester, N. Y. In addition to two children lost in infancy, there were born to H. A. Tilden six children, four daughters and two sons, and the latter, since 1879, have conducted the business relinquished to them by their father. Mr. Tilden became a member of our Association at the seventh meeting, held in the city of Washington, in 1858.

W. H. Hardy died in Ann Arbor, Michigan, February 2, 1884, of pulmonary consumption. For some time Mr. Hardy held a responsible post in the wholesale and retail house of Francis Lee, at Clinton, Iowa. He was an active member of the Iowa State Pharmaceutical Association, and some useful and valuable contributions have appeared in the pharmaceutical press from his pen. Failing in health, he went to Ann Arbor for rest, where he had studied pharmacy in 1877-8, and where his wife, a daughter of Dr. Abram Sayre, resided before marriage. At the last of our Association meetings, held in Washington, he was in attendance as a delegate from the Iowa State Pharmaceutical Association, and, immediately after the meeting, he went south for the benefit of his health, meantime attending to business in the interest of Messrs. Glover and Nicol, of Detroit. At Thomasville, Ga., his strength failed, and Mr. Glover went to his aid, and with great kindness accompanied him home, where he arrived on January 17th, only two weeks before his death. Mr. Hardy possessed the confidence and friendship of all who were associated with him. In the year 1881, at the meeting held in Kansas City, he became a member of our Association.

Howard S. Betts, of Norwalk, Conn., died there of consumption, April 25, 1883, aged twenty-seven years. Mr. Betts was born in Black River Falls, Wisconsin, and went to Norwalk with his parents when three years of age. He attended school at Norwalk, and at the age of fifteen he entered the drug store of C. S. Prowith, where he remained several years, and became well informed as a pharmacist. He then went to Meriden, and, for a period of four and a half years, was employed there in George Elsbree's pharmacy. About four years ago he returned to Norwalk, and went into business for himself. His thorough knowledge of the business, and his habit of making friends of many with whom he came in contact, brought him a large share of patronage, and his business continued to increase as the months fled by. Expecting to gain his former good health, he went to Florida and other places recommended by his physicians, thinking the change in atmosphere would be of some benefit. After remaining long enough at these places to recuperate he was compelled to return home without any apparent change; and, in a few months after his return, he died. He was a dutiful son, and was loved and highly thought of by all who knew him. Deceased became a member of our Association at the meeting at Saratoga Springs, N. Y., 1880.

Edward H. Marsh, of the firm of Lazell, Marsh & Gardiner, of New York, died very suddenly at his residence in Brooklyn, of heart disease. The deceased was born at Hadley, Mass., in 1829, and, when sixteen years of age, entered the employ of C. A.

Harrington & Co., of Worcester, with a view of learning the drug business. Subsequently, he entered the retail drug store of L. T. Lazell, with whom he remained five years, and then entered into business for himself at Worcester. About two years later, he sold his drug store, and engaged temporarily with his brother-in-law in the flour and grain business at Bellows Falls. In 1855, he went to New York City, and with his former employer, Mr. Lazell, and Mr. Hunn a partnership was formed, the successors to Haskell, Merrick & Bull. They continued in business up to 1860, when the style was changed to Lazell, Marsh & Gardiner. From that time forward there has been no change, although Mr. Gardiner retired in 1881, and Mr. Andrus was admitted in 1883. Mr. Marsh and Mr. Lazell were business partners for twenty-nine years, and had been associated in business for about thirty-five years. Mr. Marsh was a man of ingenuitous truthfulness and justice, and could always be depended upon to do unflinchingly what he believed to be right. He was much beloved by all his associates in business, his employees all testifying to his unfailing sense of justice and his personal kindness. The deceased leaves a wife and four children to mourn their loss. At the meeting held in the city of Washington, in 1858, Mr. Marsh became a member.

Paul F. Lehlbach, of New York, died very suddenly April 28, 1884, being forty-two years of age. He was born in Germany, graduated from the Philadelphia College of Pharmacy in 1862, and for many years was engaged in the practice of pharmacy in the city of New York. He was highly esteemed by all his professional friends, and was placed in many positions of trust and honor. He served as Secretary of the New York College of Pharmacy, and as one of its board of trustees; in the German Apothecaries Association he had held several offices, and not long before his death was its President. The deceased was well thought of both as a citizen and as a pharmacist. In 1872, in Cleveland, Ohio, he became a member of our Association.

James Hair, of Wilkesbarre, Pa., died May 13, 1884, aged 56 years. In 1819, he began the study of pharmacy, and continued practicing the profession of his choice up to the time of his death. About fourteen years ago he located in Wilkesbarre, where he has since resided, and during this period was in the employ of Wm. Tuck, J. C. Engle, and subsequently with M. H. Kernan. He never was in business for himself. Mr. Hair bore an excellent reputation as a pharmacist, and was highly esteemed and respected in the community where he resided. Deceased was elected a member of this Association at the meeting in Kansas City, 1881.

Augustus F. Weismann, of New York City, died there March 2d, 1884. Mr. Weismann was born in Gross-Heppach, Germany, March 6th, 1809, and was therefore in the seventy-fifth year of his age. He was educated at the Latin school in Schorndorf, and soon after took a situation in a pharmacy. He held positions of trust as managing clerk in Stuttgart and Cologne, and at Saarlouis in Belgium. He arrived in New York in 1832, and after a year of privations, succeeded in opening a small drug store on the S. W. corner of Broome and Orchard streets, in a frame building of no pretensions whatever. Here he sold drugs and practiced medicine for several years, married in 1833, and soon after removed to the brick building opposite, the present site of the store. Business prospered, a partner was taken, Mr. Henry A. Cassebeer, and soon after a branch store was opened at 365 Broadway, under Mr. Cassebeer's management, and another one in Brooklyn. This last store was, however, soon sold. In 1860 the partnership was dissolved. Besides taking considerable interest in military affairs, having served as lieutenant in the 5th regiment, he served as school trustee in 1851, and in 1857 he was elected to the board of Supervisors for a term of six years. In 1871 he was chosen State Senator to represent the 6th Senatorial district of New York City, and through his exertions the present New York City Pharmacy law was passed after a very obstinate fight in the Senate and Assembly. He was a member of the German Society of the City of New York, one of the foun-

ders of the German Savings' Bank, and of the German Hospital and Dispensary. He was director of the Oriental Bank, and of the Pacific Fire Insurance Co. In 1865 he retired from active duties in the drug business, his son Augustus becoming his successor. Deceased left three sons, two at present engaged in the drug business and the other a practicing physician. In 1869, at the Chicago meeting, deceased became a member of this Association.

Peter Squire, F. L. S., and an honorary member of our Association, died in London, April 6th, 1884, at the ripe age of 86 years. He was born at Stratton, Bedfordshire, in 1798, entered the drug business as an apprentice at the age of fourteen, and was subsequently engaged in several establishments in London and also in Paris. About the year 1831 he bought the business in Oxford street, with which he remained associated for upwards of half a century. The numerous improvements introduced by him in the preparation of extracts, and in the preservation of juices of medicinal plants, and his success as a practical pharmacist, soon gave him prominence. In 1837 he was appointed chemist in ordinary in the establishment of Queen Victoria. He was one of the original members of the Pharmaceutical Society of Great Britain, was elected a member of the first council, and of the first board of examiners in 1842, and continued to serve in both capacities until 1870 and 1869 respectively, filling for several years the office of President of the Pharmaceutical Society. Mr. Squire's work, published in 1851, in which the London, Edinburgh and Dublin Pharmacopœias were compared, forcibly showed the necessity for greater uniformity throughout Great Britain in medicinal preparations. This was finally accomplished under the provisions of the medical act of 1858, and the British Pharmacopœia made its appearance in 1864. The "Companion to the British Pharmacopœia," the thirteenth edition of which appeared in 1882, compares the Pharmacopœias of the United States and of six European countries with that of Great Britain. Mr. Squire also collected the formulas used at the principal hospitals of London, and classified them for ready comparison in the "Pharmacopœia of the London Hospitals." In 1881 Mr. Squire was a member of the fifth International Pharmaceutical Congress, and was selected as one of the vice presidents. He contributed a paper, in which the great diversity in the strength of many important galenical preparations was shown, as recognized by the pharmacopœias then in use. In 1882 the deceased was elected an honorary member of our Association.

James Lewis Hunt, of Hingham, Mass., died there in June last. Deceased conducted the drug and apothecary business in Hingham for many years; was much thought of as a pharmacist, and as a man. He became a member of our Association in 1865, in Boston.

In concluding this report, I tender my sincere thanks to all kind friends and members of the Association, who rendered me such valuable assistance when called upon. The aid I received through these friends helped to make the duties of your Chairman less laborious, and decidedly more pleasant.

GEO. W. KENNEDY, *Chairman.*

REPORT OF THE PUBLISHING COMMITTEE.

The Committee respectfully report that the manuscript for the last volume had all been received December, 1883. About the same time negotiations had been entered into with several firms, as it appeared possible that in the printing of the Proceedings a considerable sum might be saved for the benefit of the Association. This having been determined, the Committee decided to have the printing done in Lancaster, Pa. This change naturally caused some delay, and further delay was caused by the arrangements made for delivering the proof-sheets not working as smoothly as had been expected. The difficulties, however, can and will be easily remedied in case the printing be again done by the same firm.

Meantime, a general index for the volumes from 1870 to 1882 inclusive had been

prepared, and the Committee intended to issue it with the last volume of Proceedings. It was, however, soon ascertained that this would cause far greater delay than was at first supposed, and it was therefore decided to issue this General Index with the next volume. These various causes delayed the final publication of the volume, until the beginning of July, or a little over six months after the manuscript had been placed in the printer's hands. For the loan of most of the cuts used in the volume the Association is indebted to the publishers of "New Remedies," and of the "American Journal of Pharmacy," and Prof. Lloyd furnished those illustrating his paper on "Precipitates in Fluid Extracts." The cost of the phototype issued with the volume was defrayed by a number of the personal friends of the late Dr. Wm. Neergaard.

In the paper on "Stathmetic Estimation," by Mr. Alfred B. Taylor, one line of the manuscript was omitted by the compositor, whereby the sentence was changed so as to give an exactly opposite meaning to what was intended. This sentence, printed on page 394 of last year's Proceedings, should read as follows, by inserting the words printed in italics: "The name does not appear to be exactly a proper one, since the process is used not for the purpose of ascertaining *the ingredients of a compound, but simply to determine* the quantity of some ingredient already known.

The cost of publishing 1,650 copies was as follows:

Phonographic Report	\$100 00	
Composition, paper and presswork	1050 11	
Binding and wrapping	319 05	
Phototype	62 50	
Journals for use of reporter on Progress of Pharmacy:		
For 1883	\$38 40	
For 1884	12 43	
		50 83
Wood cuts		10 00
Incidental expenses of the Secretary:		
Duty on books received from abroad	\$ 57	
Packing boxes	4 50	
Freight and expressage.	71 79	
Postage stamps	124 80	
Stationery, circulars, etc.	30 60	
		232 26
Salaries of reporter and secretary	1100 00	
Total	\$2924 75	

The following stock of Proceedings is on hand, stored at the Philadelphia College of Pharmacy:

1851.	304 in paper.	1869.	97 in paper.	141 bound.
1852.	81 "	1870.	111 "	92 "
1853.	82 "	1871.	96 "	56 "
1854.	54 "	1872.	98 "	2 "
1855.	97 "	1873.	14 "	97 "
1857.	247 " 15 bound.	1874.	130 "	21 "
1858.	56 " 4 " 130 loose.	1875.	64 "	41 "
1859.	— " 36 "	1876.	42 "	39 "
1860.	— " 195 "	1877.	48 "	70 "
1862.	— " 273 "	1878.	63 "	104 "
1863.	— " 265 "	1879.	23 "	93 "
1864.	178 " 111 "	1880.	83 "	47 "
1865.	154 " 21 "	1881.	51 "	56 "
1866.	67 " 75 "	1882.	46 "	83 "
1867.	151 " 80 "	1883.	47 "	139 "
1868.	50 " 148 "			

The insurance on the above and other books remains the same as for a series of years past, it being \$2500, in the German Fire Insurance Company of Philadelphia, at a premium of \$15.

JOSEPH P. REMINGTON,
C. LEWIS DIEHL,
JOHN M. MAISCH.

REPORT ON THE ALLEGED SALE OF CONDEMNED DRUGS BY THE GOVERNMENT.

TO THE CHAIRMAN OF THE COUNCIL OF THE AMER. PHARM. ASSOCIATION.

Dear Sir: At the last meeting of the Council of the American Pharmaceutical Association, I was instructed to make inquiries at New York, what sales of "condemned drugs" had taken place there, and by what authority such sales were held. In compliance with the instructions received, I first called upon those officers of the U. S. Custom House who had dealings of one kind or another with drugs and medicinal preparations.

The principal office is that of the Inspector of Drugs, one of the special assistants of the Appraiser's Department. The U. S. Statutes provide that any drugs or medicines arriving from abroad must be inspected by this officer, who is permitted to pass them only if they come up to the standards established by law ("pharmacopœias" and "dispensatories"). Those below the standard are rejected, and must be reexported within six months, otherwise they *must* be destroyed by the Customs officers.

In former years, certain drugs were permitted to be imported by responsible firms, though the drugs were below the standard. But these firms had to give bonds as a pledge that the said drugs would not be put on the market as such. A prominent instance of this kind was the importation, under bonds, of lower grades of opium, to be used exclusively in the manufacture of morphine. At present this practice is no longer pursued, but *all* inferior articles are rejected.

No sales of rejected drugs or medicines have *ever* been held by the Customs officers.

The only other office which can possibly have to do with drugs at the Custom House is the Seizure Bureau, to which all cases of smuggling, undervaluation, and other attempts at fraud are referred. In this Bureau all confiscated or unclaimed articles are sold by public auction, but I have been officially informed that, with the exception of rare and small lots of quinine, oil of bay, etc., etc., no drugs or medicinal preparations have for years come to their notice. Moreover, their orders are that no drugs can be sold unless previously inspected and passed as "up to standard" by the inspector. Inferior articles would have to be destroyed, and could not be sold.

The inquiry at the U. S. Custom House, at New York, having thus been answered negatively, it occurred to me that possibly sales of condemned drugs had been made by the army, navy, or marine hospital service—the only other government departments having occasion to purchase and consume drugs. Accordingly, I addressed a letter to the Surgeon-general of each of these departments and requested answers to a set of questions, a copy of which is appended.

The respective officers of the navy and of the marine hospital service replied that no condemned goods are ever sold. (See the accompanying letters.) Up to the moment of writing this report, no reply has yet been received from the U. S. army; but it is hourly expected, and will be forwarded at once, as soon as received. The medical bureau of the army is, therefore, the only remaining source from which condemned drugs may possibly have reached the open market. It is to be hoped that the reply* will likewise be a negative one; and in this case the conclusion may be drawn that the reported sale

* The reply, appended, dated Washington, August 23, is similar to those of the other departments.—
PERMANENT SECRETARY.

of condemned drugs referred to by President Heinitsh, may have had its origin in some misunderstanding or groundless rumor reaching the ears of some press reporter.

Respectfully submitted

CHARLES RICE.

New York, August 22, 1884.

- | | | |
|--|---|--------------------|
| 1. At what dates, and in what places were drugs, condemned by your Department, sold during 1883 and 1884 (to date). | } | None sold. |
| 2. Were all of these of the kind usually employed for external use only? (The inquiry does not extend to surgical appliances.) | | |
| 3. Were there among them any drugs or medicinal preparations, such as pills, fluid extracts, tinctures, medicinal chemicals, etc? | | |
| 4. What was the average value of the condemned drugs? | | |
| 5. Is there a law compelling Government to dispose of all condemned articles, including drugs, by public sale? or is there any discretion residing in some Government officer, as to whether they are to be sold or destroyed? | } | No such law known. |

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL,
U. S. MARINE-HOSPITAL SERVICE,
WASHINGTON, August 19, 1884.

Charles Rice, Ph. D., Chemist, Bellevue Hospital, New York.

Sir: In answer to your letter of the 16th instant, making certain inquiries in regard to disposal of condemned drugs in this Department of the Government service, I have to say that all drugs purchased by this Department are first examined as to their quality, and if found impure, or otherwise unfit for use, they are rejected, and returned to the party from whom the purchase was made. It is seldom this has been found necessary, as samples are required before the purchase is made, and no proposals are accepted unless a pure article is submitted.

In answer to the fifth question: "Is there a law compelling the Government to dispose of all condemned articles, including drugs, by public sale?" I have to inform you that all damaged drugs, or those that become unfit for use by age or otherwise, are inspected, condemned, and destroyed, by *this* service.

Very respectfully, P. H. BAILHACHE, *Surgeon M. H. S.*
For the Surgeon-General, M. H. S., in his absence.

NAVY DEPARTMENT,
BUREAU OF MEDICINE AND SURGERY,
WASHINGTON, August 20, 1884.

Sir: In reply to your letter of 16th instant, I have to state that drugs condemned by survey as unfit for use in the Medical Department of the U. S. Navy are never sold, but are destroyed. Enclosure herewith returned.

Respectfully, J. V. K. VAN REYPEN, *Acting Chief of Bureau.*
CHARLES RICE, Esq., *Chemist Dept. P. Char. and Corr., Bellevue Hospital, New York.*

No. 3633, 84, C.

WAR DEPARTMENT,
SURGEON GENERAL'S OFFICE,
(PROPERTY DIVISION),
WASHINGTON, D. C., August 23, 1884.

Charles Rice, Ph. D., First Vice Pres. Am. Pharm. Association, New York, N. Y.

Sir: In reply to your communication of the 16th inst., I have to inform you that the records of this office do not show that any condemned drugs or medicines were sold or

disposed of by the Medical Department of the Army during the years 1883 and 1884 (to date), nor are any such sales contemplated.

There does not appear to be any necessity for the repeal or modification of existing laws and regulations governing the disposition of supplies of this character as the matter lies within the discretion of the Surgeon General of the Army, subject to the approval of the Secretary of War.

Very respectfully, your obedient servant, D. L. HUNTINGTON,
Acting Surgeon General U. S. Army.

The President appointed the following Committee on Exhibits: Wm. McIntyre, Philadelphia; W. H. Bergman, Washington, D. C.; J. Ingalls, Macon, Ga.; Geo. H. Schafer, Fort Madison, Ind.; and N. A. Kuhn, Omaha, Neb.

The Report of the Committee on Legislation was read and referred for publication (see page 364).

Attention was called to patent and proprietary medicines in the exhibition room. The Chairman of the Council read Chap. IX., Art. V., Sec. 2, of the By-laws, which prohibits the exhibition of such articles.

The Permanent Secretary read a letter from First Vice President Chas. Rice, expressing his regret for inability of attending the meeting on account of sickness.

Messrs. W. J. M. Gordon, H. B. Parsons and Alonzo Robbins were appointed the committee on the President's address.

On motion, the Association adjourned until Wednesday morning, at half past nine o'clock.

SECOND SESSION—WEDNESDAY MORNING, AUGUST 27.

The meeting was called to order by President Thompson. The Minutes of the first session were read by the Secretary, and, on motion of Mr. Colcord, were approved.

The Secretary read the following:

REPORT OF COMMITTEE ON NOMINATIONS.

TO THE PRESIDENT AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

Your Committee would respectfully offer the following as their selection for the offices named:

President—John Ingalls, Macon, Georgia.

1st Vice-President—John A. Dadd, Milwaukee, Wisconsin.

2d Vice-President—Henry Canning, Boston, Massachusetts.

3d Vice-President—C. F. Goodman, Omaha, Nebraska.

Treasurer—Chas. A. Tufts, Dover, New Hampshire.

Permanent Secretary—John M. Maisch, Philadelphia, Pennsylvania.

Reporter on Progress Pharmacy—C. Lewis Diehl, Louisville, Kentucky.

STANDING COMMITTEES.

Drug Market—M. N. Kline (*Chairman*), Philadelphia, Penna.; W. A. Gellatly, New York, N. Y.; E. Waldo Cutler, Boston, Mass.; Daniel Myers, Cleveland, O.; William Simpson, Raleigh, N. C.

Papers and Queries—J. U. Lloyd (*Chairman*), Cincinnati, O.; G. W. Sloan, Indianapolis, Ind.; W. W. Bartlet, Boston, Mass.

Prize Essays—C. Lewis Diehl (*Chairman*), Louisville, Ky.; H. B. Parsons, New York, N. Y.; Emil Scheffer, Louisville, Ky.

Legislation—J. M. Maisch (*Chairman*), Philadelphia, Penna.; S. A. D. Sheppard, Boston, Mass.; Edmund Bocking, Wheeling, W. Va.

Members of the Council, Term to Expire 1887—W. J. M. Gordon, Cincinnati, Ohio; J. L. Lemberger, Lebanon, Penna.; W. S. Thompson, Washington, D. C.

CHARLES A. TUFTS, *Chairman*.

GEO. W. SLOAN, *Secretary*.

The report was accepted, and a ballot ordered. Messrs. J. D. Wells and L. Eliel were appointed tellers.

A motion by Mr. Hallberg, that the names of the nominees be written on the blackboard, was decided in the negative.

Mr. Kuhn moved that the Secretary be directed to cast an affirmative ballot for all officers except the Council. This motion was opposed by Mr. Ebert, and negatived by a vote of 23 ayes and 30 nays.

While the tellers proceeded with taking the ballot for President, Mr. Colcord moved to reconsider the resolution passed at the first session, ordering the closing of the exhibition. The chair decided the motion to be out of order at the present time.

The tellers reported that 77 votes had been cast, of which 75 were in favor of the nominee, whereupon the President declared Mr. John Ingalls elected President for the ensuing year.

Mr. Eliel moved that a ballot be taken for the remaining nominees. A motion of Mr. Kuhn, to lay the motion upon the table, was not agreed to. Mr. Colcord moved to amend that the ballot be taken for all the nominees, except for Council. The amendment was carried, and the motion, as amended, was adopted. The tellers proceeded with the ballot, and reported the election of the remaining officers and of the Committees.

President Thompson announced that the rooms of the Board of Trade would be open to-day for the inspection of the members and suggested that a visit be paid to the rooms after the close of the session.

The Secretary read invitations from the Jos. Schlitz, the Phil. Best, and the Falk Brewing Companies to visit their establishments, which were accepted with thanks.

The Secretary also read the credentials of J. R. McDaniel as a delegate of the Arkansas Association of Pharmacists, which were accepted and the delegate admitted.

A ballot was then ordered to be taken for members of Council. The

tellers proceeded with the ballot, when Mr. Seabury nominated Mr. J. H. Harrison, of Wisconsin, as a member of Council. Mr. Eliel raised the point of order that at this time no nomination could be made until after the ballot had been taken and declared. The chair sustained the point of order. Mr. Kuhn appealed from the decision of the chair, when Mr. Menninger again made the point of order that no nomination could be made while the ballot was being taken. The Association, by a nearly unanimous rising vote, sustained the decision of the chair.

Mr. Schafer stated that the name of Mr. J. H. Harrison, of Iowa, had been used in this connection without his knowledge or consent, and it was stated that the Association had no member in Wisconsin named Harrison.

The tellers reported and the President announced that 96 votes had been cast, 13 in the negative and 83 in the affirmative, and he declared the nominees for Council to have been duly elected.

The chair appointed ex-presidents Saunders and Sargent a committee to conduct the president-elect to the chair; as Mr. Ingalls reached the platform the members arose.

PRESIDENT THOMPSON (addressing Mr. Ingalls): Mr. Ingalls, allow me to congratulate you upon your election to the office of President of this Association. To be selected at any time as the presiding officer is no mean distinction, but to be chosen by your co-laborers in the same occupation in an Association like this, representing all parts of the country, is an honor of which you may justly be proud, and it gives me great pleasure to congratulate you at this time. (Applause.) Gentlemen of the American Pharmaceutical Association, I have the honor to present John Ingalls, of Georgia, whom you have just elected as your President.

PRESIDENT INGALLS: Fellow members of the American Pharmaceutical Association, I thank you for the high honor which you have conferred upon me. I accept the trust with great misgivings as to my ability to discharge the duties with the eclat that has been gained by my predecessor; with your charity and forbearance, and with the aid which I know I shall receive from my associate officers, and with an humble trust in God, I shall endeavor to discharge the duties with all the ability I possess, and with impartiality to all. I have been the recipient of many favors at your hands. Early in my membership, I was placed upon your executive committee; twice I have been your vice-president, and a member of your Council since its creation. If there has ever been any cause to question the catholic spirit of this large and respectable association, this act of yours to-day certainly must dispel it forever. You have given the highest office in your gift to an humble member from a distant state, who has no influential membership from his section; but enthusiastic men from the length and breadth of our common country have seen fit to honor me. Gentlemen, I again thank you.

The three vice-presidents elect were then introduced by President Ingalls, and in a few remarks returned their thanks.

Mr. Menninger stated that a delegation from the National Wholesale Druggists' Association was present, and moved that the gentlemen be invited to seats and be granted the privilege of the floor. The motion was adopted.

MR. GORDON: Dr. H. H. Button is the chairman of that committee.

DR. H. H. BUTTON: Mr. President and gentlemen of the American Pharmaceutical Association: You will allow me, as a citizen of Milwaukee, to welcome you to the Cream City; with the hope that while you remain, you may enjoy yourselves. Allow me to assure you that if I can be of service to add to your pleasure while you remain, it will give me the greatest satisfaction. Of course, in these remarks, I do not appear as the representative of the Wholesale Druggists' Association, so you must excuse this digression. By your courtesy, I appear before you as the representative of the National Wholesale Druggists' Association, which, among its various committees, has one upon fraternal relations, of which Mr. James S. Birdsall is the chairman. As Mr. Birdsall was unable to be present at this meeting, I take the liberty to appear here for the Association. The committee consists of Messrs. M. N. Kline, of Philadelphia; W. J. M. Gordon, of Cincinnati; Peter Van Schaak, of Chicago; and myself, H. H. Button, of Milwaukee. Now, in behalf of this committee, as also of the Association which we represent, I beg to extend to you fraternal greetings, and to express the desire and hope that the relations which have so pleasantly existed between our organizations may continue in the future as they have been in the past. Thanking you for the opportunity to express these few words, I now give way to the other members of the committee, and I doubt not they will say a few words gladly, if you have the time to listen them.

MR. VAN SCHAAK: Mr. President and gentlemen of the American Pharmaceutical Association: The suggestion by my friend, Mr. Gordon, that I would like to say a few words, really represents my feelings. I would say, sir, that it is with great pleasure that I appear before the gentlemen of this Association, as a delegate from the National Wholesale Druggists' Association. I beg to tender to you, gentlemen, our most fervent greetings, and to express the hope—the sincere hope—that the results of your deliberations will be for the best advancement of the cause of pharmacy. I supposed, Mr. President, the duty on this occasion would devolve, as it does ordinarily, entirely upon the Chairman of the Committee. I saw my friend, Dr. Button, and I supposed that I had made an arrangement with him by which he was to do the work that is customary for the Chairman of the Committee, and that I was to play the ornamental part. It may be, sir, that he thinks that this is a portion of it. (Laughter.) Mr. President, it is fortunate indeed, that in the conduct of the drug business we have this division; in the first place, wholesalers, who devote their time to the mercantile part, and the jobbers out west, who are trying to solve the great problem how best they can sell their goods at the lowest possible prices in opposition to our neighbors in the east. (Laughter.) But, Mr. President, your department of the business is of a more elevating character. It is tending towards the more scientific portion, for which you are to be congratulated. I have often revolved in my mind, when the historian of the coming generation shall write the history of our business, upon whose shoulders will he straddle the parentage of the great patent medicine monstrosity of the day. I hope, Mr. President, that the day is not far distant when Dr. Snooks' Celebrated Anti-Constipation Compound Cathartic Railroad Pills, with Professor Sucker's Oleander All healing Ointment, good for man, and better for beast; when Old Aunt Peggy's Oleaginous Liniment, recommended by the medical faculties in Asia, Africa, and the South Sea Islands, shall be remembered among the things of the past; and when pharmacy in all its unadulterated forms shall hold undisputed sway. (Applause.) In behalf of the National Wholesale Druggists' Association, let me say that we feel that we are deeply indebted to you. Your Association, sir, has done much to stimulate us to a higher standard in the goods we handle. You, in times past, by your hearty co operation, have enabled us to wipe off the obnoxious stamp tax on perfumery, and we need your aid to get rid of another tax which was too long imposed

upon us, and which is unworthy the American people in times of peace. Mr. President, I trust that your Association, before you adjourn, will appoint a Committee to meet with our Association in St. Louis, on the 22d day of October coming; and I pledge you, sir, our best efforts to carry out every recommendation which this distinguished body shall make, in the advancement of pharmacy. (Applause.)

Mr. Kennedy read the Minutes of the eighth session of Council, which, on motion, were approved.

The Minutes show that several bills were audited; that a bill of Timothy Costello, Washington, D. C., for \$105, for carriage hire, was placed in the hands of Mr. Wm. S. Thompson, with power to settle the claim; that the applications of eleven candidates for membership had been examined, and were ordered to be reported to the Association; and that the following candidates reported at the first session had been duly elected members:

Charles Henry Darrough, Red Bluff, Cal.
 Charles William Grassly, Chicago, Ill.
 John B. Ruble, Canton, Ill.
 Gustav Scherling, Sioux City, Iowa.
 Edward Goebel, Louisville, Ky.
 Albert D. Mowry, Boston, Mass.
 Henry Fred. Hassebrock, St. Louis, Mo.
 Charles Byron Spofford, Newport, New
 Hampshire.

W. Fred. Dedrick, Kingston, N. Y.
 Philip H. Bruck, Columbus, Ohio.
 Louis Klayer, Cincinnati, Ohio.
 George Albert Gorgas, Harrisburg, Pa.
 Edward Robert Godding, Eau Claire, Wis.
 Rudolph Sauerhering, Mayville, Wis.
 Alfred Henry Mason, Montreal, Can.
 Simon W. Dodd, Charlottetown, Prince
 Edward Island.

Mr. Diehl read the introductory portion of his report on the Progress of Pharmacy (see page 25), which was ordered to take the usual course.

Mr. Schafer, on behalf of the Committee on Exhibits, requested that another member be appointed in the place of Mr. Ingalls, who, with the duties of President devolving upon him, could not attend to the work of this Committee. The request was granted, and Mr. P. C. Candidus was appointed.

Mr. Schafer also stated that the Committee found it very difficult at this late date to carry out the provisions of the By-Laws regarding the exhibition of patent medicines and proprietary articles, and asked for further instruction.

Mr. Menninger insisted that the By-Laws should be carried out.

Mr. Bartlet was of the same opinion, and moved that the Committee prepare a list of such articles concerning which they may be in doubt, and submit such list for the action of the Association. Mr. Eliel seconded this motion, and it was adopted.

On motion of Mr. Remington, it was resolved that Sections 1 and 2 of Article V., Chapter IX., of the By-Laws, be hereafter printed on the circulars issued by the local secretaries.

Mr. Ebert read the following report:

"REPORT OF THE SPECIAL COMMITTEE ON MEETING IN CALIFORNIA."

The advisability of holding a meeting of the American Pharmaceutical Association on the Pacific Coast, has been for several years a subject of agitation. Invitations to visit California have been received by our Association, from time to time, from members of the profession residing on the coast, and accompanying these have been usually coupled the hearty endorsements of the California Pharmaceutical Society, and the California College of Pharmacy.

The first-named organization has served as the professional foundation upon which the second, the College, the superstructure of pharmacal education and progress, has been reared, the two forming the "Beacon Light" of practical and scientific pharmacy which illumines the eastern coast of the Pacific Ocean.

At the Thirtieth Annual Meeting of our Association, held at Niagara, it was resolved that a special committee be appointed to take the matter of meeting in California into consideration, and make a report at the next annual meeting. Such a report was presented at our last meeting, which was adverse to the project, the committee basing its unfavorable conclusions on the following: "That the attendance from the East would be limited, and that there seemed not to be a sufficient number of interested workers residing on the Pacific coast to warrant holding a meeting there, with the prospect that such a meeting would be a success."

In getting at the facts for making the above statement, the former committee employed what seemed a most excellent method in obtaining the opinion of the individual members of this Association on this question, and the conclusions thus arrived at would undoubtedly have been accepted, had it not been for the statement which was made in the discussion of the report, that for some cause the circulars intended for, and which had been addressed and mailed to the pharmacists of the City of San Francisco, had never been received by those to whom they were addressed.

The pharmacists of that city, forming a large majority of the constituents of the profession of the coast, had on this account not been able to respond to the circular, and to this cause was wholly due the small number of answers received by the former committee from this section of the country.

This feature suggested to the Association the propriety of the continuance of a special committee on this question, with the instruction to further investigate, and report at the present meeting on the advisability of holding a meeting in San Francisco in 1886.

The present committee, in considering the report of the former committee, have drawn the following deductions from it.

We find that out of the 643 answers received by the committee from the eastern section of the country, there were 295 who approved of holding the meeting on the Pacific Coast. Of the 295 approvals, 88 answered they would attend, and 84 were doubtful.

This is a good showing for attendance, when we take into consideration the fact, that at the time the circular was issued by the committee, the impression prevailed generally that the cost of the round trip from the east would be an outlay of about \$500.

Let us take a retrospect and see what has been the number of attendants at some former meetings of this Association.

At Atlanta, we had an attendance of 60; at Toronto, 110; at Louisville, 112; at Richmond, 117; at Cleveland, 136. We certainly do not designate these meetings as not successful ones, for they were unusually and very interesting ones.

Your Committee is in a position to state positively that if this Association were to hold its meeting this month of this year in the city of San Francisco, \$200 would be an outside figure for the round trip from any point of departure on the Missouri River, and if calculated from New York, Philadelphia, or Boston, it certainly should not exceed \$300

for the round trip, involving in time about twenty-five days. From the present outlook, strong competition is likely to arise in the next few years, which certainly will have the effect of reducing the cost of the trip at least one-third of the figures given. Another feature, and an important one to the Association when financially considered, is the traveling expenses of its Secretary and Treasurer. When we go to the Pacific Coast the transportation part of this expense will be provided free of charge by the railroad company with whom the contract of transportation is made for about 100 members.

Your Committee herewith take the liberty of calling attention to this question of free transportation for the permanent officers of this Association to and from the place of the annual meetings, and it should be one the duties of the Committee on Railroads to provide for such, and thereby save the Association this annual expenditure.

To obtain, if possible, a full expression of the sentiment prevailing on the Pacific Coast for a meeting of this Association in 1886, your Committee issued a circular to the members of the profession of that section of the country, and with it enclosed an addressed postal card, on which the following questions were printed :

Are you in favor of inviting the American Pharmaceutical Association to hold their annual meeting in California, in 1886?

Should such a meeting be held, will you attend?

Will you contribute a paper to be read at the meeting?

Report of Committee "On Meeting in California in 1886."

675 circulars sent out.

158 answers received.

To first question, 155 approvals; 3 disapprovals.

To second question: 140 will attend; 5 will not; 10 probable.

To third question: 30 papers promised; 34 doubtful.

E. W. RUNYON,

H. E. HOLMES,

Committee on Pacific Coast.

At present we have about 34 members on the roll of membership from the Pacific coast, and, if the attendance west of the Missouri river should be 100, and the same number come east of it, we would have more than an average attendance at the proposed meeting. It would also be safe to calculate, provided an effort is made to obtain new members, that several hundred names would be added to our membership from the western section of the country. If only one-half of the papers promised were received, it would be a large contribution, and would add largely in way of interest and usefulness to the meeting. We have, in addition to the invitations from individual members of the profession, an official invitation from the California Pharmaceutical Association and College of Pharmacy, as follows:

SAN FRANCISCO, JULY 31, 1884.

At a meeting of the Trustees and Faculty of the California College of Pharmacy, held this day, it was unanimously voted to extend to the American Pharmaceutical Society, a most cordial invitation to hold their annual meeting in 1886 in San Francisco, and the Secretary was instructed to communicate this invitation to the Association through the committee that was appointed last year for the purpose of reporting upon the feasibility of holding the meeting of 1886 in this city.

Signed,

W. M. SEARBY,

Secretary to the Board of Trustees and Dean of the College.

Therefore, in resuming the question of holding a meeting in California in 1886, the following strong arguments in favor of it present themselves to your committee:

The comparatively small expenditure of money for such an extensive trip over one of the most interesting sections of our country.

The hearty invitations extended to us by individual members and the organized associations of the profession. The probable large accession to our membership, the promised attendance and large contributions of scientific papers, and the fact that we have but once during our existence of thirty-three years as an association, gone as far west as the Missouri river. For these reasons your committee believes that it is the duty of the American Pharmaceutical Association to go at an early date to the Pacific Coast, and by grasping the extended hands of our fellow co-laborers of this section of our country, prove that we are a National Association of Pharmacists not only in name but in deed.

For the Committee,

ALBERT E. EBERT, *Chairman*.

On motion of Mr. Menninger, the report was received and referred to the committee on the time and place of the next annual meeting. The same action was taken with a letter read by the Secretary, from C. L. Keppler, Corresponding Secretary of the Orleans Pharmaceutical Association, renewing the invitation extended last year, to hold the next meeting in New Orleans, and if possible to meet there during the Cotton-Centennial Exposition.

A motion for the appointment of a committee of three on the time and place of the next annual meeting was decided in the affirmative, and Messrs. E. H. Sargent, of Chicago; J. P. Remington, of Philadelphia; and P. C. Candidus, of Mobile, were appointed by the President.

On motion of Mr. Menninger, the resolution by which the report on the proposed meeting in California was referred, was reconsidered.

The report being up for discussion, Mr. Macmahan referred to the uncertainty of promises made to join such an excursion, and to the impossibility of making definite arrangements for transportation one or two years before a meeting.

Mr. R. J. Brown said that low rates for the round trip could be easily procured for fifty or a hundred passengers if the money was paid down. He believed that such a number would go from the East, and these, with the pharmacists and druggists of the Pacific Coast added, would make a good meeting and the trip a very profitable one.

Mr. Seabury thought that very few members could afford to leave their business, for the time necessary for the trip, and spend from \$400 to \$500 in addition.

Mr. Menninger doubted whether the objects of the Association would be furthered by going to California; even if a large number of the members would join from the Pacific States, it was doubtful whether the Association could afterwards meet there often enough to keep up the interest of these members; it seemed more likely that a section cut off from the mother Association, might be productive of good on the Pacific Coast.

Mr. Ebert stated that a party recently paid \$50 to the Union Pacific Railroad for the trip between Omaha and San Francisco, and that in two years there would be three or four competing lines. The Association

was large enough to take in the Pacific Coast, and there was no reason why a meeting should not be held there; the unusual attractions of the country induced many persons to go there on excursions.

Mr. Macmahan said that he was heartily in favor of going to California; but, with the many opportunities for spending money on such a trip, he thought the expense would be increased to about \$1500.

On motion of Mr. Remington the report was now referred to the committee on the time and place of the next annual meeting.

Mr. Diehl read the following report, which was accepted and referred for publication:

TO THE AMERICAN PHARMACEUTICAL ASSOCIATION:

Gentlemen: Your Committee on Prize Essays have the honor to report that, having carefully reviewed the papers read at the Thirty-First Annual Meeting, they do not consider that any of them are entitled to the prize.

Respectfully submitted,

C. LEWIS DIEHL, *Chairman.*

EMIL SCHEFFER,

ADOLPH W. MILLER.

The following paper was read by Mr. Robinson, and, on motion of Mr. Menninger, was referred to the Committee on the President's Address:

At a recent meeting of the Wisconsin Pharmaceutical Association, a committee was appointed to confer with representatives regarding the present taxes upon alcohol and its products, and further to present the views of the association on this subject, to your honorable body.

Inasmuch as the present duty on alcohol is universally recognized by pharmacists to be oppressive and prejudicial to their best interests, and directly opposed to that healthy advancement which pharmacy, in common with other branches of science, should be making; and as we regard the government tax upon pharmacists as retail dealers especially unwise and burdensome, we recognize the fact that discrimination in this matter is a practical impossibility, therefore we can look only to the total abrogation of all duties on alcohol for relief.

While we believe that the government is now in a position to do without this source of revenue, we realize that we urge a vital question of economy, and yet we are in favor of precipitating the question, if for no other reason than that of forcing legislative discussion upon it.

Therefore, as we regard concerted and systematized action as the only means of arriving at a reasonably speedy result, we venture to present the following resolution, as representing our views and in execution of our duties as the committee on taxes appointed by the Wisconsin Pharmaceutical Association.

Resolved, That the Secretary be instructed to institute, by correspondence with the Secretaries of every State Association, a concerted movement, consisting of petitions to Congressional Representatives, having for its object the total abolition of all duties on alcohol.

Mr. Seabury read the report of the Entertainment Committee of last year. Mr. Bartlet moved that the report be received and placed on file. Mr. Canning moved to amend that it be referred to a committee of three. The amendment was accepted and the motion agreed to.

Mr. Colcord read the following report, which, on motion of Mr. Lemberger, was directed to be referred to a special committee.

REPORT OF COMMITTEE ON UNOFFICIAL FORMULAS.

In accordance with a resolution adopted at the last meeting of this Association, a committee was appointed to present at the present meeting a list of non official formulas such as would meet the requirements of the pharmacists of the country in enabling them to prepare such of the various elixirs, emulsions, fluid extracts, wines, ointments, etc., as are prescribed by the medical fraternity and supplied by manufacturing chemists through the wholesale trade, or otherwise. Although differing slightly, the preparations supplied by so many different manufacturers are in the main identical. Yet in order to be able faithfully to comply with the demands of physicians, all these kinds must be kept in stock, greatly to our detriment, and we think in the end, to that of the consumer.

Seeing this to be the case, efforts have been made in different pharmaceutical bodies to remedy the evil by furnishing formulas that the average pharmacist could prepare himself and dispense with the assurance that they contained the ingredients specified, and of the best quality also.

The result, if attained, would prove advantageous to physician, pharmacist, and patient alike, both therapeutically and financially, and remove the source of much annoyance and misunderstanding, as at present, a prescription filled in one locality if filled in another where the dispenser is not familiar with the requirements of the prescriber, unless some particular maker's preparation is specified or the formula furnished, is likely to have the preparation returned with many unflattering comments—often resulting in the loss of a customer.

While the object sought by the various local and State associations was a commendable one, it was found that it tended to add to the perplexity, as adding more and diverse formulas. The remedy for this seemed to be that the only recognized national body—the American Pharmaceutical Association—should publish such a collection that should be the source from which local and State associations could adopt, and solicit the aid of physicians in prescribing, thus giving uniformity throughout the country. Several State associations have already appointed committees awaiting the result of our efforts with the view of adopting.

The following gentlemen compose the committee to whom the work was committed: J. W. Colcord, Lynn; S. A. D. Sheppard, Boston; Ewen McIntyre, New York; J. T. Shinn, Philadelphia; N. H. Jennings, Baltimore; Chas. Becker, Washington; J. D. Wells, Cincinnati; M. W. Alexander, St. Louis; C. L. Keppler, New Orleans; E. T. Cowdrey, Chicago; and Emlen Painter, San Francisco, now New Jersey.

Prof. Painter resigning from ill health, Prof. Searby was appointed in his place, who also resigned, and Mr. S. F. Ranson was appointed. After a somewhat extended correspondence, the Committee was subdivided, giving elixirs to a committee of five, pills to two, and emulsions, wines, ointments, fluid extracts, to one each. To our request, published in the pharmaceutical journals, and by circular, that pharmacists possessing new and approved formulas should forward for publication, not a reply has been received. Prof. Lloyd generously offered the Committee permission to select any formula from the valuable collection as published by him. Application was made to several of the committee publishing the "New York and Brooklyn Formulary," which contains many excellent formulas, to select from their collection, but as yet such permission has not been granted. The committee on emulsions and fluid extracts report lack of time; the committee on ointments, simply that the various petroleum products may be used advantageously and profitably in preparing the official ointments; the committee on pills report various formulas for excipients and coating; the committee on wines, several working formulas; the committee on elixirs report progress.

Owing to the fact that the Committee was appointed from localities that precluded a meeting or meetings, it is regretted that an acceptable report cannot be made. It is recommended that the subject be referred to another committee, consisting of three or five, from some locality where they can work harmoniously, with instructions to furnish such a list in time for publication in the Proceedings, or be authorized to print at the expense of the Association.

For the Committee,

J. W. COLCORD, *Chairman*.

MR. COLCORD: Since this report was written, I have received from the Committee on Ointments, a report containing good working formulas; also a partial report from the Committee on Elixirs, was sent by the chairman of the committee, Mr. Shinn, of Philadelphia. I think the work of the committee will be acceptable to the Association, and also profitable.

MR. MENNINGER: I want to explain an allusion in the report, to the formulary of the New York and Brooklyn Societies. It may seem strange that they should have copy-righted this publication, but they were compelled to do it in order to defray the expenses of publication. The committees of the three societies, the New York College of Pharmacy, the German apothecaries of New York, and the Kings County Society labored for many weeks assiduously, with probably the best talent that those societies and cities can afford, and they have presented a publication which I may say is a credit to the committee, and embraces about all that there is yet known in the East, on this subject. The price is put at 50 and 65 cents.

MR. BEDFORD: Samples of the leading elixirs made according to this formulary are on the table of Emerson, Fuller & Co., up-stairs. They have been placed there to be examined by the members of this Association. Allusion was made to the fact that no reply had been made by the New York and Brooklyn Committee. As the chairman of the committee, I had no right to make any reply until the committee could be called together. This occurred only a week ago, just before I left New York, and we were unable to give the permission that is asked for, as the matter stands. Any one could use the formulas, but really, we cannot give the permission to print them promiscuously. They have been placed at a very low price, and anybody who wants to get copies can get them up-stairs.

MR. COLCORD: I have tried many of the formulas, and I think that this Association should be allowed to use them, and that we should give them due credit. They have been published in various pharmaceutical journals; but this does not make them official; and they will not be official until they are adopted by this Association. New formulas coming out should be examined and approved.

The Association then paid an official visit to the exhibition, and afterwards adjourned until Thursday morning at 9 o'clock.

THIRD SESSION—THURSDAY MORNING, AUGUST 23.

The meeting was called to order by President Ingalls at 10 o'clock.

The minutes of the second session were read by the Permanent Secretary, and on motion, were approved.

Mr. Kennedy read the minutes of the first session of the new Council which were, on motion approved, and the recommendation contained therein, adopted. These minutes give the following information:

The organization of the Council resulted as follows: *Chairman*—Joseph P. Remington; *Vice-Chairman*—John A. Dadd; *Secretary*—G. W. Kennedy; *Committee on Membership*—G. W. Kennedy, H. J. Menninger, John Ingalls, C. F. Goodman, A. E. Ebert; *Finance Committee*—S. A. D. Sheppard, J. L. Lemberger, Henry Canning; *Publication Committee*—J. P. Remington, C. L. Diehl, William Saunders, H. J. Menninger, J. M. Maisch.

The following candidates, previously reported, were duly elected to membership.

Ludwig Heller, Chicago, Illinois.	Clarence George Stone, Detroit, Michigan.
Andrew Scherer, Chicago, Illinois.	Ashbel H. Merrell, Cincinnati, Ohio.
David P. Cox, Terre Haute, Indiana.	Edwin W. Lancaster, Marshall, Texas.
J. Theodor Krehe, Muscatine, Iowa.	Max Gessler, Milwaukee, Wisconsin.
Daniel T. Macdonald, Calumet, Haughton county, Michigan.	Albert H. Hollister, Madison, Wisconsin.
	Hans Kienth, Milwaukee, Wisconsin.

The Treasurer's report was referred to an auditing committee consisting of Messrs. A. E. Ebert and C. F. Goodman. The Treasurer reported that the sums donated at different times by several members, amounted to \$316. On motion, it was resolved to recommend to the Association, that this amount be withdrawn from the general fund and added to the life membership fund.

The President announced the following committees:

Committee on the Report on Unofficial Formulas—Ch. Rice, P. W. Bedford, W. P. De Forest, S. J. Bendiner, and A. Tsheppe.

Committee on the Report of Entertainment Committee: E. H. Sargent, Chicago; Charles Eberle, Philadelphia; and G. W. Sloan, Indianapolis.

Mr. Lloyd read the following report, which was accepted:

REPORT OF COMMITTEE ON PAPERS AND QUERIES.

We would respectfully suggest that the following scheme be followed during the ensuing year, believing that such will be to the advantage of the Association:

1. Obtain as many acceptations of papers as possible during this meeting, the names of those who accept being retained by the Committee.

2. As soon as practicable after the meeting the chairman of the Committee shall print the list of queries, without the names of persons who have accepted. This list shall be sent to each member of our Society, with a request that a subject be selected and a paper presented at the next meeting, or else that a volunteer paper be furnished.

3. The queries shall be printed in the Proceedings, but the names of those who are to write shall be retained by the Committee.

We are of the opinion that a change in method for obtaining papers is a necessity, and we think that a plan such as the above will be conducive of good results. If more than one writer contributes to a given subject, we doubt not the interest in the meetings will be enhanced.

The Secretary read the following report:

The Committee on Time and Place of Next Meeting recommends that the Association adjourn to meet in New Orleans on Monday, April 9, 1885, at 3 o'clock p. m.

In reference to the question of meeting in San Francisco, in 1886, your Committee is of opinion that it is not desirable to recommend it at this time.

E. H. SARGENT,
P. C. CANDIDUS,
JOS. P. REMINGTON.

Mr. Sloan moved that the report be adopted.

Mr. Macmahan moved to amend by inserting Montreal in place of New Orleans.

The original motion and the amendment were seconded.

Mr. R. J. Brown spoke in favor, and Mr. Wm. H. Rogers in opposition to meeting in New Orleans next spring.

Mr. Colcord moved, and Mr. Canning seconded an amendment to the amendment that the next meeting be held in Newport, R. I., in September, 1885.

Mr. Sloan offered the further amendment that the next meeting be held in Pittsburg, and showed that this city is easily reached from all points.

Mr. Macmahan withdrew his amendment in favor of the one offered by Mr. Sloan.

Mr. Good spoke in favor of going to Newport during the last week in August, which was seconded and discussed by Mr. Seabury.

Messrs. Remington, Wells, and E. W. Lancaster spoke in favor of meeting in New Orleans, and Messrs. Rogers, Good, Eliel, Bartlet, Underhill, and Hallberg in opposition to it, and to holding a meeting in April.

The question being taken on the amendment to insert Newport in the place of New Orleans, 30 members voted in favor and 44 against the motion, and the amendment was declared lost.

The vote on the amendment to substitute Pittsburg for New Orleans resulted in 45 ayes and 28 nays, and the amendment was, therefore, adopted.

Mr. Eberle moved to amend the report, by inserting, in place of the time mentioned therein, the second Tuesday of September.

Mr. Day moved to make it the second Monday, and, after some discussion, the motion of Mr. Eberle was carried, and the original motion as amended was carried, that the next meeting be held in the city of Pittsburg on the second Tuesday of September, 1885.

On motion of Mr. Macmahan, it was

Resolved, That any motion to change the time and place of the next annual meeting be required to lie over for one session.

Mr. Kennedy presented the following, which was adopted:

WHEREAS, The sessions of this Association are disturbed, and the desired attendance of its members prevented, by the attention given to the exhibition—which, however worthy, should not be allowed to interfere with the principal object of these meetings; and,

WHEREAS, ample time is afforded for the inspection of the exhibit without such disturbances; it is hereby

Moved, that the Exhibition Hall shall be closed to all persons, excepting watchmen, during the sessions of the Association, and that the watchmen be directed to keep the doors of the Exhibition Hall locked during the sessions.

Mr. Colcord moved that the Local Secretary be informed of the passage of this resolution. The motion was carried, and Mr. Colcord was appointed a committee of one for the purpose stated.

Mr. Sloan offered the following :

WHEREAS, It is intended that all business matters shall be considered, and so far as is practicable, settled, by the action of the Council, to the end that ample time shall be had during the sessions for the hearing and discussing of scientific papers and queries;

AND, WHEREAS, it has hitherto been difficult to draw the line between the function of the Council and the necessary action of the whole Association; it is therefore

Moved, That at all sessions of the Association the reading of papers and the discussion thereon shall have the preference and precedence of all other matters, and that no matter of general business, save only the election of officers, shall be introduced or debated when it interferes with or delays the reading of papers and the discussion thereon; and, also, it shall be the duty of the presiding officer to enforce this rule promptly, provided, however, that the Association may at any time stipulate a certain hour wherein any special subject shall be considered, and the said subject shall be introduced at the time designated by the chairman of the Council, giving the recommendation or previous action of the Council thereon.

Mr. Thompson suggested that instead of being merely a resolution which at any time could be reconsidered, the subject should be incorporated into the By-Laws, and moved that the resolution be referred to the Council with the direction to report a By-Law for the action of the Association, defining the manner in which business not of a scientific character shall be brought before the Association.

After discussion by Messrs. E. A. Sayre, Menninger, Sargent, W. S. Thompson, Seabury, Rogers, Lloyd, and Remington, Mr. Menninger moved to amend that the Council report thereon on the following morning. The amendment was accepted by Mr. Thompson, and the resolution was unanimously adopted.

Mr. Kennedy read the names of eight applicants for membership, the applications being directed to take the usual course.

Mr. Bartlet read a paper on opium assays in answer to query 6 (see page 475).

MR. MENNINGER.—I don't know whether I understood the first part of the paper or not. I think it was stated that several experiments were made with commercial opium; was this taken from the same cake, or from a sample case?

MR. BARTLET.—The experiments were made with commercial powdered opium. If one sample was taken from three different masses the result would be of very little value. The idea was to carry the three processes on from the same sample of the opium. The process of the U. S. Pharmacopœia was thus shown to be far ahead in every respect.

MR. GOOD.—I did not clearly understand what kind of ammonium chloride Mr. Bartlet used.

MR. BARTLET.—I used it in a crystalline form.

MR. GOOD.—Large masses?

MR. BARTLET.—Yes, sir; in the crystalline form.

MR. GOOD.—In what way did you use it?

MR. BARTLET.—I used it in the simplest way; it was powdered, and the process does not demand very fine powder.

MR. GOOD.—Do you think it is the purest form of chloride of ammonium?

MR. BARTLET.—That is the kind directed by some of the works on volumetric analysis.

MR. GOOD.—It seems to me, the better plan would have been to dissolve the sal ammoniac in hot water, and granulate.

MR. MAISCH.—I believe Mr. Bartlet referred to the morphine strength required by different Pharmacopœias of opium. I do not know whether it was stated by him that the morphine strength required by the British Pharmacopœia, refers to the crude opium of commerce, not to the powdered opium.

MR. BARTLET.—The British Pharmacopœia says, "opium," but does not say in what shape.

MR. MAISCH.—It gives a description of the crude opium, and then states that this crude opium should yield not less than six per cent. of morphine.

MR. BARTLET.—Undoubtedly this refers to the crude opium. It leaves the question open. My reason for using the ammonium chloride was that I considered it pure enough, because Wanklyn, in his work on "Water," considers it pure enough to make standard solutions.

Mr. Power read a paper on Hydrastine (see p. 448), which was accepted with the thanks of the Association and referred for publication.

MR. EBERT.—I would like to ask Professor Power whether the empiric formula which he has given us is identical with Dr. Mahla's.

MR. POWER.—It is identical with Mahla's formula modified.

MR. EBERT.—What is the modification?

MR. POWER.—The difference is in the hydrogen. His formula is $C_{22}H_{24}NO_6$, the formula I use is, $C_{22}H_{23}NO_6$, which gives better results.

MR. EBERT.—In connection with this paper, I would like to call the attention of the Association to this very important fact, that a number of manufacturers have been putting on the market a preparation which they call sulphate of hydrastia or hydrastine. I would inquire of Professor Power, which is the proper name, hydrastine or hydrastia?

MR. POWER.—According to the nomenclature adopted by the Pharmacopœia, the names of all alkaloids terminate in ine; it should therefore be hydrastine.

MR. EBERT.—These preparations have been called hydrastine and hydrastia, and are merely sulphate of berberine. Attention has been called several times to this fact. The difficulty with most dispensers is when they get a prescription from a physician calling for one of these salts, to determine what to dispense; is it berberine or hydrastine? It is an important matter, and this Association should call the manufacturers' at-

tention to it so that they adopt a correct nomenclature, that druggists and pharmacists will know what to dispense.

MR. LLOYD.—In regard to Mr. Ebert's observation, I may say safely that to within about five years from the present time there was no confusion in this matter, because formerly salts of berberine only were found in commerce. Since that time we have had the white alkaloid hydrastine introduced into commerce; it has been prescribed by physicians, and used quite extensively and now it has become necessary to specify "the white alkaloid." It is customary with manufacturers to still insist on using that name hydrastine, who, by the way, know that there is a right on that side of the question, for Rafinesque, in 1828, applied to the yellow alkaloid the term hydrastine, which ante-dated the term berberine. It is important to take that into view, and I think the alkaloid should properly be called hydrastine, although the term berberine is used, notwithstanding the fact that this was the last name given to it. Several other names had been given previously to the same alkaloid. Berberine was applied to an extractive of *Lerberis vulgaris*, and was afterwards affixed to the yellow alkaloid. At the present time, manufacturers as a rule are endeavoring to substitute the word berberine for hydrastine. I think this should be thoroughly understood so that we can understand what we are using, whether it be the white alkaloid or the alkaloid known formerly as "hydrastine." I am afraid some of us are not endeavoring, as we ought, to straighten the matter out.

MR. HALLBERG.—This is an important question, bearing upon our knowledge of various pharmaceutical preparations. The attention of physicians has been called to various compounds of these alkaloids, such as an elixir of the citrate of hydrastine and bismuth. I would like to ask Professor Power whether it is possible to prepare a solution in water or glycerin, containing bismuth, hydrastine and alcohol?

MR. POWER.—It would be possible by having the solution strongly acid; by using nitric acid both substances could be held in solution.

MR. MENNINGER.—As a citrate?

MR. POWER.—It would have to be in the form of a nitrate and not in the form of a citrate. Hydrastine cannot exist in alkaline solution.

MR. HALLBERG.—Another elixir is stated to contain two grains of pyro-phosphate of iron, and a half a grain of berberine in an almost colorless solution.

MR. POWER.—I should presume that it would contain very little berberine. Berberine is very sparingly soluble in water; it is soluble in 70 parts of water, but the solution is very highly colored.

MR. HALLBERG.—In the presence of iron it shows a dark green color.

MR. POWER.—This is not the reaction of berberine. Berberine gives no reaction with iron.

MR. HALLBERG.—Yes, sir; it produces a dark green color.

MR. POWER.—It should not if pure.

MR. HALLBERG.—In my experiments, I found that the salt gives a dark green color with iron, the citrate, the chloride, and the pyro-phosphate.

MR. MACMAHAN.—I would like to ask if the gentlemen have very much confidence on the labels placed on these preparations. We never supposed, in our neighborhood, that they contained what they are said to contain.

MR. LLOYD.—I do not think this valuable paper ought to be passed by without some further discussion. There are some interesting things in the paper. Professor Power has been for a long time engaged upon investigating the subject, it now being nearly three years since it was accepted. If I had known that he had intended to make it more explicit than the query demanded, I might have been of some little assistance. In the first place, I would like to have supported him by my experience with these products. He remarks, that hydrastine forms uncrystallizable salts. For some twelve years I have been endeavoring to obtain crystals of hydrastine, and I have failed. These experiments have been conducted not with small amounts, but five or ten pounds of the alkaloid have been used at a time in the endeavor to get crystals, but that is a point upon which I have always failed.

Last winter, when the temperature in Cincinnati reached 22 degrees below zero, I exposed the sulphate, the hydrochlorate, and one or two other salts, in dishes to that temperature, but I failed under this and all other conditions, and could not obtain a single crystal of a salt of the white alkaloid; therefore, I think you may properly say that the salts of this alkaloid are uncrystallizable under ordinary conditions, and that is one point I wish to make. The results of Professor Power show conclusively that there is no close relation between the alkaloids berberine and hydrastine. I think that is admitted, yet there must be some relation in some way. I have been convinced from my experience in working these substances, that berberine will disappear under certain conditions, and that there will be a production of a large amount of hydrastine. What the intermediate form may be through which it passes in changing from berberine to hydrastine is in doubt. *Hydrastis canadensis* contains other substances, and although my experiments have failed to support those of Burt in obtaining this third alkaloid, I would not say that there is not such an alkaloid in *hydrastis*. It may be that my experiments were not carried out as well as they should have been; perhaps I have failed in some particular. I have consulted those who can give important information on this subject and agree with them that peculiar products are formed under certain conditions in preparing hydrastine. For example, Professor Power spoke of the fact that the solution of caustic potash does not change the alkaloid; but I think it is different when we use caustic soda. My impression is that there is more than one alkaloid. These compounds split up easily. If, for example, you take the sulphate of berberine and heat it with water, it forms a soluble compound, an acid sulphate apparently, and then the third alkaloid or other alkaloidal substances may be formed. Perhaps future experiments may throw more light on these changes.

MR. MAISCH.—In relation to the third alkaloid, I can say that I have seen the results of the experiments of Mr. Lerchen, and if I remember rightly, I have a specimen of that alkaloid prepared by him in Philadelphia. I am not prepared to speak upon the process by which that alkaloid has been obtained by Mr. Lerchen. I do remember, however, that it resembled berberine in its behavior in several of its characteristic reactions, while in others it was quite distinct, so that I think that it cannot be regarded as a mixture of two alkaloids, but rather as a distinct alkaloid. Besides the reactions, Mr. Lerchen had obtained a number of compounds which also seemed to indicate that this alkaloid is a uniform substance.

MR. GOOD.—Professor Power has spoken of the peculiar action of the ferric chloride upon this alkaloid.

MR. MAISCH.—That was not described by Lerchen.

MR. POWER.—In *hydrastis* there is an organic acid which gives a reaction with ferric chloride. Of course it would give the same reaction if present in hydrastine as an impurity. No action of that kind is attributed to any alkaloid now known.

Mr. GOOD.—I do not gather from these discussions that it is at all practical to make an elixir of hydrastine and bismuth. If it is necessary to use nitric acid, we can make a solution of trisnitrate of bismuth. We cannot reduce the acid strength without precipitating the bismuth at once. Perhaps it may be possible to use the citrate of bismuth and dissolve with the aid of ammonia, for forming an elixir; I do not see any other way. If such an elixir is on the market it is worth an examination to ascertain whether it contains what it claims.

Mr. LLOYD.—Such an elixir is on the market; at least there is a demand for such an elixir, but I have not been able to prepare it satisfactorily.

Mr. HALLBERG.—I have a large specimen of the solution spoken of, which is clear from any precipitate. It can be seen up stairs.

Mr. L. E. SAYRE.—Can one of the members present inform me as to the relative therapeutic value of the white alkaloid and its salts, and of what is sold as muriate of hydrastine or berberine.

Mr. LLOYD.—If I understand the results attributed to the investigation of these substances, the white alkaloid hydrastine is used in diseases of the mucous membrane, and it is valued by some in that way, whereas berberine is used more as a tonic; it is very bitter, and is used as a tonic, or even as an anti-periodic, the other being used exclusively for diseases of mucous surfaces, as an eye-wash, or for similar purposes.

Mr. L. E. SAYRE.—The question is, whether there is sufficient therapeutic value in the white alkaloid that would probably create in the future an extensive demand for it. Physicians often ask us these questions, and I should like to be informed on the subject, whether it is considered as possessing any therapeutic value.

Mr. LLOYD.—I should regret to see a large demand for the white alkaloid. If there was much of a demand I doubt whether it could be supplied. It is yielded in very small amounts—four or five pounds, at the outside, from a thousand pounds of hydrastis. Hydrastis has not yet become extinct, but is becoming very scarce, and if there should be a large demand for this alkaloid it cannot be supplied.

Mr. KENNEDY.—One of our physicians has used hydrastine during the past year for inflamed mucous surfaces, with very good results, but in exceedingly small doses—almost homœopathically—using from one to two grains in a two-ounce mixture of glycerin and water, with a small percentage of citrate of bismuth, both as an internal remedy and as a local remedy; and he is well pleased with it. He finds much better results with the hydrastine than with the berberine, which he formerly employed, and the use of which he has abandoned altogether. Professor Lloyd gave me two or three drachms a few years ago, and that has not been used up, although it has been frequently prescribed during the past ten or twelve months. The physician is well pleased with the results obtained from its use.

Mr. L. E. SAYRE.—You will please excuse me for taking up the time, but this is a matter I am very much interested in. Through Professor Lloyd, I have received crystals of hydrastine, which I have shown to educated physicians in Philadelphia, and I have been asked the question by them, what practical use is this substance? Now as we may have physicians present who can give us that information, I shall be very glad if they would take the floor and speak on the subject.

Mr. MENNINGER.—It is perhaps not quite possible to settle definitely what definite principle of the drug gives the therapeutic effect. The use of hydrastis in infusion and

in fluid extract has certainly increased wonderfully during the last ten or fifteen years. I remember when a clerk in a drug store years ago, that we scarcely ever had a call for it. In my own store in Brooklyn, I doubt whether a week goes by in which we do not have three or four prescriptions for preparations of hydrastis. Singularly enough the fluid extract is prescribed for local application to the mucous membrane both externally and for the urethral mucous membrane. According to some the preparation must act as an irritant, and yet there is a continuous demand and an increasing application in that way. Of course the alcohol would have a rather deleterious effect when the fluid extract is used as an application to inflamed mucous membrane; a beneficial effect is unquestionably due to the alkaloid. And if this be the case, I have no doubt the demand will extend to hydrastine.

MR. KENNEDY.—Is the fluid extract used in an undiluted condition?

MR. MENNINGER.—It is diluted, of course.

MR. LLOYD.—Those with whom I am acquainted, who use the preparations of hydrastis, have claimed for years that they cannot obtain the effects of hydrastine from the yellow alkaloid. As an eye-wash, hydrastis has been given to us by the Indians, and as an eye-wash the white alkaloid or an infusion or decoction of hydrastis is used, little dependence being placed upon the yellow alkaloid.

MR. GOOD.—In response to what Mr. Menninger has said, I would state that to my knowledge the fluid extract has been used in the way he mentions.

THE SECRETARY.—When Mr. Kennedy was speaking, I believe I understood him to say that physicians prescribed one or two grains of the alkaloid hydrastine in two ounces of water with citrate of bismuth. Is that ammonio-citrate of bismuth, and is the alkaloid dissolved in the solution of ammonio-citrate of bismuth.

MR. KENNEDY.—Yes, sir; it dissolves. Four grains of ammonio-citrate of bismuth and one or two grains of hydrastine in one part of glycerin and one or two parts of water.

THE SECRETARY.—No acid is added?

MR. KENNEDY.—No acid is added.

MR. HALLBERG.—The solution I have prepared is of a greater strength—two and a half grains to a fluid drachm. That of which Mr. Kennedy spoke was very much weaker.

MR. VOGELER.—Mr. Kennedy referred to the difference between hydrastine and berberine. Did he refer to the muriate or sulphate?

MR. KENNEDY.—I referred to the muriate.

MR. VOGELER.—How is it with the sulphate?

MR. KENNEDY.—That I do not know.

MR. VOGELER.—My experience teaches me that the sulphate of berberine is very useful in cases of trouble with the mucous membrane. I do not know whether the sulphate of berberine that is found in the market is entirely free from the alkaloid of hydrastine.

Mr. Colcord read a volunteer paper on Canutillo, and exhibited speci-

mens of the plant and of the fluid extract prepared from it. The paper was accepted and referred for publication (see page 462).

MR. MENNINGER.—I would like to ask whether Mr. Colcord tested the fluid extract for tannin?

MR. COLCORD.—I did not, but I judge it does contain a large amount of tannic acid.

MR. MENNINGER.—There are so many new remedies for inflammation of the mucous membranes, that it is hard to keep a record of them. I think that their reputation in nearly every case is due to tannic acid.

MR. COLCORD.—I do not think it is fully due to tannic acid, though it may be in a large majority of cases. I only had a short time to make experiments with it. As to the results, so far in every case that has been brought to my attention, it has proved a success.

THE SECRETARY.—I suggest that Mr. Colcord send a small specimen to Mr. Charles Mohr, of Mobile, Alabama. There is no man better acquainted with the flora of the southwestern section of the United States and the northeastern portion of Mexico than Mr. Mohr.

MR. EBERT.—I fully agree with Mr. Menninger, and with Mr. Colcord, I desire that these new remedies, if they are such should be brought before us and receive attention. It would be proper, however, for those who bring them before us that the fact of being new remedies should be well sustained. We are now overloaded in this country with new remedies. The fact cannot be concealed that new remedies are filling our stores with bundles and packages, and our income becomes smaller and smaller every year, and the sooner we protest the better it will be for us. If tannin will answer the same purpose, let us use that. There is no advantage in going to some far-away place to get a remedy at an expensive price, and load up our stores with it. When we bring a substance of this kind before our Association, we ought to determine what the activity is due to. The question should be asked, has it properties that we cannot get from official remedies? Otherwise, we keep on adding and adding here a little, and there a little, until we overload our stores with remedies, which become dead capital in our hands.

MR. BROWN.—I have had some experience with the pioneers who have gone into the Western border and made selections of plants, for the purpose of curing various diseases. By their association with the various tribes of the Indians, they have learned the uses of these plants in various diseases, for instance, in the curing of chills and fever, and in other diseases common to the Indians. The pioneer physicians have had to resort to these plants in practising medicine, and it is not an uncommon thing in sections of western Texas, and also in the western corners of Nebraska for the physicians to use these remedies, and they are continually presenting specimens of plants with accounts of the most remarkable and wonderful kinds of cures. The American people are always very much interested in getting some Indian cure for a disease. I think the masses of people are not seeking scientific physicians and druggists; but to get remedies to cure their diseases, they must look for some wonderful remedy brought forth by the Indians. I believe a large part of the preparations similar to the one described this morning are already in the United States, and I have seen a large part of them. The new remedies thus offered are entirely made up of plants. They are not offering us any minerals to cure diseases.

THE SECRETARY.—One thing should be taken into consideration, and that is, what

is required to supply the different sections of our country. If these plants are used in western Texas, and they are found useful, let them be used there. If they prove of value, let them be used in preference to taking medicines from among those which we use or which come from foreign countries. Many of these new remedies will possess some value in the future. It should be remembered that some of the so-called new remedies, are in reality old remedies, which have been used 100 or 200 years ago, and have been forgotten; the one before us, I believe, is new.

MR. BROWN.—I wish to add one more word. In Central Texas, a gentleman has discovered a plant upon which he places great value for the cure of neuralgia and catarrh. An infusion of the leaves is used and from his history it presents a remarkable remedy. The gentleman came to us with a little package of it. We handed it to some persons present at the time, to give it a trial. It is used by snuffing it up the nostrils. We found it far exceeded Cayenne pepper in its effect, and after we had used it once did not want any more of it.

MR. COLCORD.—Many of the pharmacists of this country are not thoroughly posted, and many advanced members, I think, throw a discouragement upon them, more so than should be done. My principal object here was as much for my own information to see what could be learned upon the subject. I did not find anything at all about it in the text books. If it has brought out nothing, it has done no harm. It may stimulate efforts in other further investigations. I think there are many medicinal plants in this country that will be brought forward and have their therapeutic value vindicated materially in this way.

MR. MENNINGER.—I hope that nothing I said will be taken as showing discourtesy towards any person; on the contrary, I must say that my remarks in reference to tannic acid were made simply to throw a little more light upon the subject. It is the only way we can eliminate the superfluous from our Pharmacopœia, by investigations such as have been conducted by Mr. Colcord.

MR. COLCORD.—I would say in reply to Mr. Menninger that I did not refer at all to him. I am always glad to have members ask for information.

Mr. Good read a paper written by Mr. S. G. Ade, on the fungoid deposit in diluted phosphoric acid, which was accepted and referred (see page 432).

MR. MENNINGER.—Did Mr. Ade prepare the acid, or did he receive it from some one else?

MR. LLOYD.—This paper has been received by the Committee, and we cannot answer this question.

MR. MENNINGER.—In connection with any fungoid growth that may occur in diluted phosphoric acid the manner of its preparation should be considered.

MR. LLOYD.—He speaks as though he used the officinal acid.

MR. MENNINGER.—It is unfortunate that many of these preparations have found their way into the market with their label all right according to one or other formula, and still are not to be relied upon.

MR. LLOYD.—Has it been found whether distilled water used in preparing diluted phosphoric acid will produce the same result?

MR. MENNINGER.—That is the reason I asked whether the gentleman prepared it himself.

MR. REMINGTON.—In relation to this subject I would say that as long ago as 1869, I showed the presence of this peculiar growth. It is one of the *conservæ* and it was exhibited under the microscope at one of the meetings of the Association. I have, however, found that it is not peculiar to Phosphoric Acid or dilute Phosphoric Acid. We know that some of the *conservæ* are found in similar preparations. It is very easily produced. When I was with Dr. Squibb I noticed in the making of Phosphoric Acid of the Pharmacopœia, as long ago as 1869 or 1870, that this plant gave a good deal of trouble, floating about as flocculent masses in the diluted Phosphoric Acid. Upon examination it was found in other aqueous solutions. The identity was proved. The recommendation which is made here by Mr. Ade, I think will very greatly do away with the trouble which is produced by this plant: the use of the concentrated acid which is to be diluted when the officinal *Acidum Phosphoricum* of the Pharmacopœia is ordered. It is never seen in the strong phosphoric acid, but it only occurs in dilute solutions like the diluted phosphoric acid. I have also found it in other diluted acids, notably in the diluted citric acid and in some other dilute acids.

MR. L. E. SAYRE.—One point concerning this paper which is very interesting to all, I think is this: what amount of depreciation is sustained by the growth of this plant? I asked Professor Formad, in Philadelphia, a similar question. A solution of eserine that I had on hand would have been a great loss to me if that growth had been from the substance itself. He said that I need not be at all alarmed—that he did not find it to feed upon the alkaloid itself so much as it did upon the substances in composition with it, and largely upon water. Now, I rather think that the impression that this paper gives, is that the plant is feeding upon the acid. This is a question that it would be well for future inquirers to investigate. From my conversation with Professor Formad upon this subject my impression would be that this growth does depreciate the acid, and does not feed upon it.

MR. REMINGTON.—I rise particularly to briefly answer that question. I do not think that any of us need be very much afraid of serious results to the preparation, from the growth of these plants, because in a single solution of the diluted phosphoric acid I do not think that the greatest number of plants that could be obtained if they were allowed to multiply for several years would weigh more than 20 grains. I am not prepared to state, however, what injury these plants would effect in a delicate alkaloidal solution. I think that thus far it is more injurious to those than to such preparations as diluted phosphoric acid. I think that diluted phosphoric acid of commerce is much more apt to suffer from imperfect and defective manipulation than from any injury it would receive from the microscopic plant, which has been described.

MR. OLDBERG.—Was the water which was added to the phosphoric acid distilled water? I ask for this reason: I have purchased a 50 per cent solution of the acid. A small proportion of it was diluted with water, and in that solution a large quantity of the growth appeared. Subsequently I diluted the acid with distilled water, and it soon became in the same condition. The diluted acid on hand was under the same conditions, but in that there is no such formation.

MR. MENNINGER.—What was the reason of that?

MR. REMINGTON.—I would say in answer to Mr. Oldberg that these plants will form almost as quickly in distilled water as in ordinary water. I have prepared vessels espe-

cially to receive the liquid and have cleaned them chemically, using distilled water with the phosphoric acid, and the result was that I have found these plants in the preparation, just as soon as when the precautions were omitted. I do not think that the use of the distilled water will keep out impurities of this kind. We find them, indeed, in pure distilled water.

MR. HALLBERG, of Chicago.—My experience shows me that these growths are very bothersome. By using distilled water in place of hydrant water, they do not appear to collect on the surface, although they still appear. I have not yet found any means of preventing their appearance in the compound acid phosphates.

MR. MAISCH.—Phosphoric acid as such can scarcely be regarded as a nutritious substance for these algæ. I would suggest whether the presence of a small portion of alkali would not be likely to account for it. I think you will find, as a rule, that the growth of the *confervæ* takes place much more rapidly and successfully when alkali is present. I have noticed it grew more frequently in the solution of phosphoric acid prepared from glacial phosphoric acid than in the dilute phosphoric acid prepared directly from phosphorus. I remember distinctly keeping the acid in different bottles under apparently similar circumstances, when one set of bottles would produce the algæ and the others would not produce them. I attributed it at the time to the peculiarity of the phosphoric acid, and its action upon the glass, that the glass becomes somewhat corroded; a little alkali might be dissolved in the water, and in that way promote the formation or growth of the *confervæ*. On the whole, I doubt whether the *conferva* can reduce the strength of phosphoric acid. It certainly could not do it in any other way than by the formation of or combination with ammonia. In this way it may produce an ammonia salt by combining with a portion of the phosphoric acid. Certainly the phosphoric acid cannot disappear.

MR. EBERT.—I wish to give my experience some eight or nine years ago in regard to the effect of these plants. We had a large demand for citrate of iron and quinia, and, to facilitate the dispensing of the salt, we would keep this preparation in solution, and would make as large a quantity of it at a time as a quart. On one occasion I put up a prescription containing this salt in solution, and, two hours after it had been dispensed, the physician came into my store and asked whether I had not made a mistake in putting up his prescription—that after the first or second dose of the remedy had been taken the patient had been seized with violent gripings and diarrhoea. Having put up the prescription myself, I was not as certain as I ought to have been, but I said to the physician that I would be glad to dispense it again, but that, to the best of my knowledge, the prescription was put up correctly. I noticed this fungoid growth in pouring the solution out of the quart bottle, but did not think that there would be any serious results. The medicine was sent out, and the husband of the lady came back and said: "I concluded, before I gave this medicine to my wife, that I would take a dose of it myself, and I did so, and I think the physician has made a mistake, because it has produced the same effect upon myself." I could not explain why it should have this effect. I told the physician what I had observed, and he advised me then to put up the prescription from the salt. The lady took the medicine, and it was afterwards administered by myself to others, and there was no unpleasant effect.

MR. BROWN.—I am glad that this subject has been presented. Probably most of us can recollect this growth in the solution of phosphoric acid, and in my experience the solution of citric acid will produce it likewise. It occurs also from making up a large quantity of the solution of certain salts, like those of strychnine, which are often kept on hand for convenience in dispensing. I think that is a mistake, and that solutions of that

kind are liable to change in the manner described. I believe this discussion will have the effect of stimulating inquiry, so that when we return home, we shall look up these bottles, and see how many of them are undergoing a change.

Mr. OLDBERG.—It seems to me that it is evident from what has been said, that any solution found in that condition is unfit for use.

On motion of Mr. Eliel, the Association adjourned until 4 o'clock in the afternoon.

FOURTH SESSION—THURSDAY AFTERNOON, AUGUST 29.

The Association was called to order by President Ingalls at 4 o'clock.

The reading of the Minutes of the third session was, on motion, dispensed with for the present.

The Minutes of the second session of Council were read and approved.

The business transacted by Council was as follows:

The name of Mr. R. O. Sweeney, of St. Paul, Minn., who had relinquished his right to life membership under the old rules, was, at his request, placed again on the roll of members without claim on the Proceedings.

The drafting of a by-law in relation to the transaction of business of a non-scientific character by the Association, was referred to a committee with the instruction to report, if possible, on the following morning.

The chairman of the Council was appointed a committee to prepare an order of business for the guidance of the Council.

Bills for hall rent and printing, amounting to \$187.50, were audited.

The applications of the candidates for membership were examined, and the following candidates, previously reported, were elected:

George Omar Guy, Chicago, Ill.

Asahel H. Lyman, Manistee, Mich.

George Huhn, Minneapolis, Minn.

Otto A. Wall, St. Louis, Mo.

Charles E. Hall, Greenville, N. H.

William C. Nicholas, Orange, N. J.

Calvin Walbridge Preston, Galveston, Tex.

Frank M. Crolus, Milwaukee, Wis.

Mr. Gordon read the following report from the Committee on the President's Address, which was accepted, on motion of Mr. Oldberg, the recommendations, which involve some amendments to the By-Laws being laid over for action at the next session:

TO THE PRESIDENT AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Gentlemen: Your Committee appointed to consider the recommendations in the President's Message, beg leave to submit the following report:

They recommend that the salary of the Permanent Secretary be increased to \$750.00, and that Art. I., Chap. xi., of the By-Laws, be amended in conformity to this.

They are of the opinion that the condition imposed upon the recipient of a certificate of membership to return the same on relinquishing his connection with the Association,

should be abolished by striking out so much of Art. VII., Chap. viii., as demands the return of the certificate.

The recommendation that the initiation fee should be abolished, is a step that your Committee do not feel safe in expressing an opinion upon; we think it should receive careful and mature consideration, and recommend its reference to the Council.

The subject of adulteration and inferior quality of drugs and chemicals is of great importance, and we endorse the views as expressed by the President, and would recommend the course suggested by him in clause 1st, 2d, 3d, 4th and 5th on this subject.

It is our opinion that the Committee should not be selected specially with reference to scientific attainment, but of persons in the best positions for attaining such articles as would be desired for examination, and that the Committee should be empowered to place them in the hands of one or more analysts for examination; the sum of \$500 to be placed at the disposal of the Committee to defray the necessary expense.

W. J. M. GORDON, *Chairman*,
HENRY B. PARSONS,
ALONZO ROBBINS.

Mr. Gordon also read the following report, which, on motion of Mr. Brown, was received and referred to the Committee on Legislation:

TO THE PRESIDENT AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION:

Gentlemen: The committee to whom was referred the communication and recommendation of the Wisconsin Pharmaceutical Association, on the repeal of the tax on alcohol, beg leave to say that the subject is one of such immense importance that they feel a hesitation in making any recommendation; but we are unanimously of the opinion that the abrogation of the tax upon spirits should only be on that used for medicinal or mechanical purposes, and would recommend the reference of the communication to the Committee on Legislation.

Respectfully,

W. J. M. GORDON, *Chairman*.
HENRY B. PARSONS,
ALONZO ROBBINS.

Mr. Oldberg read a paper on standard dimensions for percolators which was accepted and referred (see page 388).

MR. LLOYD.—I am glad to see that the subject of percolators is being taken up. There is something to be said about the grinding and powdering of material, and its manipulation. As Mr. Oldberg and others have found, we must have good material to operate on if we would make good preparations. Still, the adulterations of the drug are to be considered in taking into account the form, size and shape of the percolator.

MR. REMINGTON.—I think that Prof. Oldberg is doing very good work in bringing this subject before the workers on percolation in this country. It has long been a wonder to me that glass manufacturers have not been enterprising enough to make these percolators. It seems to me, at the same time that something must be said with regard to percolators now in use. I believe the percolators now in use are perfectly fitted to certain operations; for instance, where the quantity of the drug is relatively of a smaller amount and the menstruum large, the present percolators answer perfectly. In making fluid extracts, however, it is manifest that the higher the column stands the better will the menstruum extract the solid parts of the drug, and therefore I think the results will show that we will have these tall percolators in the market, and I think at the same time those which will then be called the old-fashioned percolators, will answer a very good use for strong tinctures and weaker preparations.

MR. OLDBERG.—I agree entirely with Prof. Remington. Of course the percolators in the stores of the pharmacists will not be useless. The new percolators will be available for every purpose, so that hereafter, I should prefer to see the trade purchase the new percolators, and to disregard the old ones entirely, excepting those already purchased and now on hand. It is true that short percolators will answer perfectly in making tinctures of less than half-weight strength, but the tall, narrow percolators will answer every purpose for fluid extracts and tinctures.

MR. BROWN.—If the relative size of percolators, or their length compared with the width is to be regarded, what plan may be advised to manufacturers making large quantities of fluid extracts? According to this statement of relative dimensions, tall percolators, would be required that would take up too much room in a place of business.

MR. OLDBERG.—I do not believe that manufacturers who make up large quantities of fluid extracts would use simple percolations at all; but they will use re-percolation. A great many use re-percolation, and other processes are in use. The largest vessel recommended in the paper will hold a little over three gallons, and is a little over two feet high.

MR. REMINGTON.—I was about to say a word, Mr. Chairman, in answer to Mr. Brown—that large percolators are not very extensively used, and I would not advise any of the members of this Association to invest largely in percolators much over 26 or 28 inches in height. I had a fancy that way and ordered some 36 inches in height; one cold night 4 of the 6 were broken. These were not in use, but cracked whilst lying upon the counter. It is very difficult for manufacturers to thoroughly anneal the glass of the percolators as large as those with their present facilities, and these were made specially to order. I have since ascertained from a number of other pharmacists that they have had similar experiences with regard to large percolators. I would say, in reference to tin and copper, that they are available for percolators in operations, involving 200 or 300 pounds of material at a time. Stoneware jars are used where the drugs are liable to be injured by metallic contact. I never saw a manufacturer who made large quantities, who would use large glass percolators. They would no doubt be glad to do it if they could profitably, because the advantage of using glass is that the operation can be seen and watched so thoroughly.

MR. LLOYD.—Some 2 or 3 years ago, I obtained half a dozen ten-gallon glass percolators, and I found that they lasted but a very short time, as Prof. Remington has stated, but I do not think the trouble arose altogether from the imperfect annealing of the glass. One trouble that I experienced in several instances began after the material had been moistened and packed in the percolators properly, when the glass would expand and burst. Afterwards, I would moisten quickly, allow the moist powder to stand, and then pack into the percolators; but it made no difference, the glass percolators were all broken, and there is not one of them left, so that I think I can positively support Prof. Remington's statement, that it is not economical to purchase large glass percolators.

MR. HALLBERG.—I have half a dozen large glass percolators, 36 inches high. One is broken, and the remaining five have been in constant use for about three years, and since I adopted the method of putting them into supports where they were surrounded by large wide cords or bands of India rubber there has been no trouble. I have no doubt that there is more or less expansion taking place in the glass percolator as in the hard wooden or metal rings or supports, the material of which is of such a character as not to allow the glass to expand, and then a fracture will take place. If, however,

the glass percolator rests upon some soft material, like rubber or cork, I do not think any trouble will be experienced from expansion.

MR. L. E. SAYRE.—I have had percolators to break where the weight came upon the holder. The weight pressing down on the wooden holder will finally wedge the percolator in, in such a way that the only relief for it is to crack. There is one more feature in regard to percolation that has often struck me as worthy of attention, and that is in macerating the material in the percolator. The common custom is to put a cork in the percolator and then allow the maceration to continue. It has occurred to me, that perhaps a better way would be to have the top of the percolator well ground, and covered with a ground-glass plate instead of corking the lower aperture, which might be left open so that the precolate may run as much as it will. It will finally be prevented from falling down by the atmospheric pressure, and when it is desired to commence percolation all that is necessary is to remove the ground-glass cover sufficiently—even a pin-hole is sufficient—to admit the atmosphere, and percolation will then again be inaugurated. I think that this method, properly carried out, is much better than closing the aperture with a cork.

Mr. Coblentz read a paper on commercial bromide of potassium, which on motion of Mr. Kennedy, seconded by Mr. Brown, was accepted with the thanks of the Association, and referred for publication (see p. 433.)

MR. L. E. SAYRE.—I would like to ask Mr. Coblentz one question, which may perhaps have been answered in his paper, but not noticed by me—whether the specimen in which he obtained the largest percentage of alkaloid was granular or in crystals?

MR. COBLENTZ.—Of the granular salts found in the market, one was alkaline and the other neutral. The crystallized salts bearing the same label were averaged pretty uniformly, except one showing the label of a prominent manufacturer in this country.

Mr. Macmahan, who had acted on the committee attending the meeting of the National Wholesale Druggists' Association in 1883, in the place of Mr. Gordon, made a humorous verbal report, a written report not having been received from the committee.

On motion of Mr. Remington, a committee of five was directed to be appointed to visit the National Wholesale Druggists' Association at its next annual meeting at St. Louis, in the second week in October. The President appointed on this committee Messrs. Enno Sander, J. M. Good, A. E. Ebert, Chas. Huston, and Virgil Coblentz.

Mr. Kennedy reported favorably from the Council three applications for membership.

Mr. Hallberg read a volunteer paper on Simultaneous Fractional Percolation, with notes on some fluid extracts. On motion of Mr. Remington, the paper was received with thanks, and referred for publication (see page 392).

Mr. Sloan read a paper by Dr. H. T. Cummings, entitled, A Study of Percolation. Mr. Oldberg moved that the paper be referred to the Committee on Publication, with authority to expunge from it whatever may appear as objectionable. After some discussion, in which Messrs. Ebert,

Lloyd, Good, and Menninger participated, Mr. Diehl moved to amend that the reprint of the paper made by the committee in charge of the papers be likewise referred with the original paper. The amendment was accepted by Mr. Oldberg, and the motion passed (see p. 398).

Mr. Tufts read the Treasurer's annual report, which was ordered to take the usual course.

TO THE OFFICERS AND MEMBERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Gentlemen: As instructed by the By-laws, I herewith present my report for the year 1883-4. I am unaware of any bill unpaid, and we have a balance for another year of \$6,260.57. In addition, the Association has the following invested funds: Ebert Fund, \$692.26; Centennial Fund, \$1,289.65; Life Membership Fund, \$944.14, making a total of \$9,186.62. If our meeting had been at the usual time, two weeks later than the present date, I could have reported a larger balance in the treasury. Still I have the pleasure to report an increase to our resources of \$1,120.35 during the past year. In 1869, we had not a dollar in the treasury, and I advanced \$29.63 to meet our expenses. In my report that year I remarked that the Treasurer was like the children of Israel in Egypt, who were required to make bricks without straw. Truly, "the little one has become a thousand."

At the last session I was directed to ascertain and report the amount that had been at different times donated to the Association. I find \$316 has been thus donated, and I would suggest that the same be withdrawn from the general fund and added to one of the invested funds of the Association.

Our life membership has not increased the past year, but several members have the subject under consideration, and will, I judge, before another year has passed, become life members. Twenty-five members whose connection with the Association has ceased have retained certificates, and eighty members are liable to be dropped for non-payment of dues. I have reported the names to the Secretary of the Council. I shall take pleasure to reduce the list as much as possible before our Proceedings are published. I am happy to report the members do not take umbrage at my efforts in that direction.

It has always been my good fortune to maintain very pleasant relations with the members of the Association, and this year has been no exception. I renew my thanks for our pleasant correspondence during the past year. With kind wishes for you all, I close my report.

Statement of the Receipts and Disbursements of the American Pharmaceutical Association, for the year ending August 26th, 1884.

1884.

RECEIPTS.

Aug. 26.	To balance on hand Sept. 3d, 1883	\$4196 58
	To the amount received for yearly contributions for 1879	30 00
	" " " " 1880	60 00
	" " " " 1881	180 00
	" " " " 1882	565 00
	" " " " 1883	3205 00
	" " " " 1884	1370 00
	To the amount received for membership	470 00
	" " from the sale of certificates	272 50
	" " from the sale of proceedings	20 00
	" " from the Ebert fund	20 50
	" " from interests on deposits	129 37
		<hr/>
		\$10518 95

1884.

DISBURSEMENTS.

Aug. 26. By cash paid for the expenses of the *Proceedings*:

Inquirer Printing Co., printing	\$1050 11	
“ “ binding	319 05	
Cyrus H. Morgan, phonographic report	100 00	
F. Gutekunst, photographs	62 50	
William M. Clark, engraving	17 00	
Hans M. Wilder, work on index	150 00	
C. Lewis Diehl, salary as reporter of the Progress of Pharmacy, from Sept., 1882, to Sept., 1883 . . .	500 00	
	<hr/>	\$2198 66

By cash paid for expenses:

John M. Maisch, salary from Sept., 1883, to Sept., 1884	600 00	
Cash paid for miscellaneous expenses, including the expense attending the meeting at Washington, printing, stationery, freight, expressage, packing boxes, and postage	304 19	
	<hr/>	904 19
Charles A. Tufts, salary from Sept., 1883, to Sept., 1884	500 00	
Cash paid for miscellaneous expenses, including the meeting at Washington, printing, stationery, ex- pressage, filling out certificates, the expenses of collectors in cities, and postage	169 82	
	<hr/>	669 82
George W. Kennedy, salary as secretary of the Coun- cil from Sept., 1883, to Sept., 1884	200 00	
Cash paid for miscellaneous expenses, including printing and postage	112 50	
	<hr/>	312 50
Samuel A. D. Sheppard, expenses of the Examining Committee	34 90	
Charles Becker, expenses of the meeting at Washington	96 25	
Joseph P. Remington, expenses as Chairman of the Council	6 56	
Insurance of the property of the American Pharma- ceutical Association, stored in Philadelphia College of Pharmacy	15 00	
Ebert Prize paid to John U. Lloyd	20 50	
	<hr/>	\$4258 38
Balance to new account	6260 57	
	<hr/>	\$10,518 95

CHARLES A. TUFTS,
Treasurer.

Mr. Kennedy presented the resolution passed by the Council and read at the third session, as follows:

Resolved, That the sum of \$316, which amount has been in past years donated to the funds of the Association, by various members, be withdrawn from the general fund, and be added to the life membership fund.

The motion was carried unanimously.

The following resolution from the Committee on the President's Address was read:

Resolved, That the sum of \$500 be placed at the disposal of the Council to carry out the examination of drugs and chemicals in the manner recommended in the annual address of ex-president Thompson.

MR. EBERT.—I hope that this motion will not pass; but that we shall seriously consider what we are doing. \$500 is a large sum, and if we vote it away in this manner, our money will rapidly disappear like the morning dew before the rising sun. It will be well enough to let that motion lie over to the next annual meeting. I don't see the necessity for any hurry in voting this \$500 for experimentation; for that is all that it amounts to. I believe in looking after our finances. We once had to borrow money from our Treasurer. We have got some money now, don't let us spend it in a hurry. I move that the motion lay over until the next annual meeting.

MR. OLDBERG.—I hope that this resolution will not prevail. We have all listened to the report of the Treasurer, and I think that we can very well afford to expend \$500 for the purpose of investigation.

MR. BROWN.—You will not want to hamper the Committee in any way; if we have got the money it is all the better for us; let us make some use of it.

MR. MENNINGER.—I second the motion of Mr. Ebert, and I would like to have time to give you my thought on this matter. There is no need of any haste—you do not need the \$500 this coming year, and we are not likely to use it. The fund we have has not been exhausted. The money is ours, whether we carry it in one pocket or another, and we may as well carry it in the same pocket another year.

MR. HALLBERG.—There seems to be great anxiety manifested as to how some money can be expended for carrying on investigations. There is a staff in the Colleges of Pharmacy that, I understand, have instituted pharmaceutical laboratories. Now it is quite possible that a sum of money could be distributed to these laboratories of the Colleges of Pharmacy, and in that way the investigations could be carried on. Pharmaceutical investigations require a great deal of material, and some of them are very expensive. That would be the best place to carry on these investigations, for they could be carried on there without trouble, and be directed by skilled professors. It is quite possible that such an arrangement could be made.

MR. REMINGTON.—I would say, in regard to this matter, that the Centennial Fund of this Association is available for that purpose: It seems to me that this is a very simple matter. It is not that we are going to raise \$500.00 and then spend it at all. It is merely putting \$500.00 at the discretion of the Council, to advance if it is needed, or a portion of it if all is not needed, for the purpose of conducting experiments which will prove the presence or absence of adulterations or sophistications. It seems to me that some money should be devoted to this purpose. It is a legitimate object, and it is desirable to have it carried out. I listened to the President's remarks on adulteration and sophistication with a great deal of interest, and I do not think that there will be any risk or any loss whatever, and the chances of getting at our next meeting a very thorough report on adulterations and sophistications, at the expenditure of not more than \$100 at best, and possibly not even that, are very great indeed. I should dislike very much to see any backwardness on the part of the Association to expend a few dollars in this

direction. As for the whole amount, I think that \$500.00 is entirely too excessive. If Mr. Ebert would reduce the amount, and make it \$100.00 if he is satisfied with that—but I do not think that we ought to throw cold water on this proposition.

THE SECRETARY.—One word in reference to this matter. I did not intend to say a syllable on this proposition, because I did not believe that the money if voted and placed at the disposal of the Council, would be needed, but that only a small portion of it would be used. Thus far we have not been very successful with our Centennial Fund. Our treasurer, Tufts, can probably tell us that there must be available now, from the interest accumulated during the past years, between \$150,000 and \$200,000, which sum is directly available and can be used only for such and similar purposes. The President, the chairman on the Finance Committee, and the Permanent Secretary constitute the committee that can dispose of that money, which has to be devoted to such researches. For the Centennial Fund was instituted for the purpose of aiding original investigation.

MR. EBERT.—I will explain why I wanted this matter to lay over to another meeting. My idea is that the Council should give us at the next annual meeting a scheme as to how this money shall be used. I do not want the Council to have that power until they tell us how the money is to be expended. I think that this Association ought not to give this money away now, without knowing just how it is to be used.

MR. OLDBERG.—This is somewhat strange. The Association has ample confidence in the Council and is willing to endorse the Council at all times, even to the inauguration of original investigations, by placing in their hands so small an amount as \$500 annually, or so much of it as may be needed. I hope there will be no delay.

MR. MENNINGER.—I do not want to prolong this discussion, but I will call your attention to one thing. It is considered on all sides that there is sufficient money—that \$500 of the money is available, and has not been used. I will make a further statement that the moneys of the Association are under the supervision of the Finance Committee, in the hands of Treasurer who has invested our money, and that they are drawing interest. Why make any change? Why break up your rate of interest for a certain period, simply to take the money out of one pocket and to put it into another, when there is no good use for it. This Association will always be ready to aid original investigations—why hasten this matter? It is just as secure a year from now as it is to-day. I hope that Mr. Ebert's motion will prevail.

Mr. Ebert's motion, as amended by him, that the resolution appropriating \$500, be referred to the Council for consideration and report at the next annual meeting, was agreed to.

The following resolution was presented from the Committee on Legislation:

Resolved, That the President appoint a special committee of three to present to Congress the bill published in the Proceedings for 1883, granting a commission to the apothecaries of the army and navy.

The resolution was adopted.*

* The bill was introduced in the House of Representatives by Hon. Sam. J. Randall, and was referred to the Committee on Military Affairs, where it received no action.—
PERMANENT SECRETARY.

The Secretary offered the following resolution, which had been sent to him by Professor A. B. Prescott:

Resolved, That the President appoint a committee of three members to report to the Association, at its next annual meeting, upon the most feasible and suitable legislation to secure a sufficient statement of the composition of proprietary medicines to be put upon each package of the same, and upon the most favorable and efficient action to be taken by this Association in regard to this matter.

The resolution was adopted, and the President appointed on this committee, Messrs. A. B. Prescott, Chas. Rice and Fred. Hoffmann.

Mr. Sargent read a report from the Committee on the Report of the Entertainment Committee.

Mr. Good moved that the report be accepted. Considerable discussion took place, when Mr. Macmahan moved that the consideration of the report be made the special order of the morning session at 10 o'clock. During the lengthy discussion which followed, a motion to adjourn was made but not seconded. A motion to indefinitely postpone was seconded but afterward withdrawn in favor of a motion to recommit the report to the Committee.

The Association then adjourned until Friday morning at 9 o'clock.

FIFTH SESSION—FRIDAY MORNING, AUGUST 29.

The Association assembled at 9:30 a. m., President Ingalls in the chair. The minutes of the third and fourth sessions were read and approved. Mr. Kennedy read the minutes of the third session of Council.

The minutes state that the proposed by-law was not ready to be submitted; that bills were audited, and that the following members were elected:

Arthur L. Green, Ann Arbor, Mich.; Max Robert Zaegel, Sheboygan, Wis.; Francis Edward Stewart, Philadelphia.

The applications of the following two candidates were examined and referred to the Association.*

William Thomas Thackeray, Davenport, Iowa; Peter L. Dohmen, Milwaukee, Wis.

Mr. Sargent read a report, which, on motion of Mr. Wells, was accepted, and then adopted without discussion. The report is as follows:

REPORT OF SPECIAL COMMITTEE ON THE REPORT OF THE ENTERTAINMENT COMMITTEE AT WASHINGTON MEETING.

Your committee upon the report of the Entertainment Committee, at Washington, recommends that the report as now amended by that committee be published, and that the thanks of the Association be tendered for their successful efforts in providing entertainment for the members present at Washington.

* Both candidates were elected at the fourth session of Council.—PERMANENT SECRETARY.

Your committee does not deem the legislation proposed in the report, to be necessary or desirable, but as a substitute therefor would suggest that there shall be annually chosen, or appointed, a chairman of a committee of arrangements, who shall appoint four (4) other members of the Association as his assistants, and who together shall constitute a committee of arrangements, and be so published in the volume of Proceedings.

The duty of this committee shall be to make all the arrangements for the next annual meeting of the Association, secure hotel accommodations, provide suitable entertainment for the members, which shall in no case be allowed to interfere with the sessions, and in all matters shall, in consultation with the Local Secretary, have authority to act for the Association in providing for the welfare of the Association and for the comfort and entertainment of the members of the annual meeting. It shall be the duty of the chairman to report to the Council, at each annual meeting, the receipts and disbursements pertaining to the discharge of his duty.

Your committee recommends that the balance of money remaining in the hands of the Washington Entertainment Committee, as shown by the report, be placed with the Treasurer of this Association, to be held as a special fund; subject to the order of the Chairman of the Committee of Arrangements.

It is also recommended that the Association provides a suitable metallic badge, which shall be furnished to any member on his payment of the cost of the same.

Signed by

E. H. SARGENT, *Chairman*,
CHAS. L. EBERLE,
GEORGE W. SLOAN.

SPECIAL REPORT OF THE COMMITTEE ON ARRANGEMENTS AND ENTERTAINMENTS.

MR. PRESIDENT AND FELLOW MEMBERS :

In submitting the second report of this Committee it gives us pleasure to state that, socially and financially, the meeting at Washington was a complete success, and, as at Niagara, presented the advantages of independence and an organized plan of proceedings.

We beg leave to repeat our former recommendations, and thank the Council for having acted on them favorably, as an evidence of their sympathy, and of the importance of our suggestions : the Committee was prevented from acting on them during the meeting. The convictions expressed in a special report to the Association have in no manner been modified, but rather strengthened by our second year's experience, namely, that to correctly interpret the wishes of a decided majority, this Committee, for its own future welfare and that of the Association, should be rendered independent and permanent.

This Committee reluctantly refers to expressions uttered by a few discontented members in this year's report, which are as unjust as they are undeserved. The first report simply presented an array of truths that are the result of experience, and which are as deserving of study and of examination as the most delicate chemical analyses.

The meeting at Washington was attended by over 500 persons—members, their families and friends—and was conspicuous for the large attendance of new members. The programme, as arranged by your Committee, was faithfully carried out as printed, with the simple exception of a carriage ride to the Soldiers' Home—a lost pleasure for which the Association must hold the elements responsible. Taken as a whole, our Thirty-first Annual Meeting was a delightful reunion of old and new members.

The prescribed work of the Committee was greatly increased by the absence, through sickness, of one of its members; we were compelled, at a critical moment, to revisit Washington, and appointed Dr. A. J. Schafhirt our local associate. To this gentleman the Association is under many obligations for the indefatigable and excellent service ren-

dered at an embarrassing period, by the prompt execution of all matters placed in his hands—a labor which this Committee cannot recognize in any better or more befitting manner than by tendering him our grateful thanks. The Committee also acknowledges the kindness of Mr. H. W. Atwood, in acting as Mr. Macmahan's substitute.

The funds in our possession are held subject to the will of the Association, and more especially at the disposition of those who assisted in its creation. This surplus is the result of the Committee's energy, and of the Association's programme, with its attractive events: we deemed it advantageous to give greater and more continuous publicity to our meetings than heretofore, and were rewarded by disposing of more tickets than we had anticipated; these balances, the one of \$284.04 at Niagara, and the present one of \$299.12 are due chiefly to the purchase of tickets by invited guests; large numbers can alone make balances possible. To induce a large attendance at our meetings, and to insure an excellent return for the cost of the Association's programme, has been the chief aim of the Committee. Success will be the general experience, if we are unhampered by individuals who are ever ready to dictate in matters in which they share no responsibility, offer no service, no sympathy, and for which they possess no talent.

Therefore, we most respectfully recommend, consistently with the recommendations of the first report, that the Association act on the following amendments in conformity with Article V. of our Constitution to Article I, Chapter 7, on committees—add, as permanent committees after committee on legislation—a committee of arrangements and entertainments, and a committee on railroad transportation.

The object and duties of these newly added committees are described as follows, and to be known, when approved, as Article VIII., with two added sections, and Article IX., of the same chapter on committees:

The Committee of arrangements and entertainments shall hold a conference, either collectively or through its chairman or deputized member, at the place selected for the next meeting of the Association, at least three months prior to date of the same, to which shall be invited the local secretary, and local associate committee, for the purpose of arranging a programme. This committee shall be composed of three members elected by the Association. They shall have power to appoint a local associate committee, and a reception committee. They shall also have power to appoint their own treasurer, subject to the approval of the Association. Any funds to the credit of this committee shall be considered independent property, to be expended only for legitimate purposes, connected with this special committee.

ARTICLE VIII. *Section 1.*—The local associate committee shall consist of one or more members, as the Committee of Arrangements may decide, who shall execute all matters assigned them, but who shall not close any contract, or create any liability, unless specially instructed to do so, in writing, by the Committee of Arrangements. It shall also be the duty of the local associate committee to secure rooms for all members who write in advance for such accommodation, and shall also have power to appoint a clerk for the Entertainment Committee, Bureau of Information.

Section 2.—The Reception Committee shall consist of three members whose duty it shall be to receive members and introduce them to each other, as well as to render such courtesies as will tend to promote sociability, in which capacity they shall continue to act throughout the entire meeting.

ARTICLE IX. The Committee on Railroad Transportation shall be composed of four members elected by the Association, representing the eastern, western, northern and southern states, whose duty it shall be to manage for the Association all matters relating to railroad rates, and excursions, and to publish at least one month in advance of the time of meeting a circular containing rates of fare, special starting points in their respec-

tive sections, a plan of arranged excursions, and all other useful information connected with the subject,—the chairman to reside at the most important railroad centre.

Very respectfully submitted by the Committee,

GEORGE J. SEABURY,
H. MACMAHAN,
W. H. ROGERS.

STATEMENT OF COMMITTEE ON ARRANGEMENTS AND ENTERTAINMENTS (OF THE 31ST ANNUAL MEETING) HELD AT WASHINGTON, D. C., SEPTEMBER 11-14, 1883.

Disbursements.

Receipts and Assets.

Edward Abner's bill for banquet for 250 covers, orchestra, and services furnished	\$806 00	Balance in hands of committee from Niagara meeting	\$284 04
Robert Sneider's bill for rosettes, printing silk menus, orders of dancing, envelope cutting, dies, and embossing	195 90	Tickets sold at Washington, 381 at \$5 each	1905 00
H. B. Claffin & Co.'s bill for silk ribbon used for menus	35 27		
Bailey, Banks & Biddle's bill for engraving invitations for concert, and envelopes	140 00		
To postage stamps for mailing invitations	87 85		
J. D. Bowman, <i>Clerk</i> , at Washington	18 00		
Herdie Phaxton Company, for conveying ladies to the A. P. A. Ball	15 40		
Telegrams, messengers, stationery and expressage at Washington	7 50		
Special printing at Washington	11 00		
G. J. Seabury, R. R. fares, hotel expenses, first visit	31 10		
T. J. Macmahan's bill for R. R. fares, hotel expenses, stamps, etc., used in connection with R. R. transportation	29 40		
Telephoning during meeting	4 50		
Carriages for concert for ladies	5 50		
Dr. J. A. Schafhirt, local disbursements for concert, and ball, details in annexed bill	487 50		
G. J. Seabury for stamps, stationery, postal cards, telegrams and sundries	15 00		
G. J. Seabury, R. R. fares, and hotel expenses for 2d and subsequent visits. No charge	0 00		
Balance in hands of committee	299 12		
(E. & O. E.)	\$2189 04		\$2189 04

Very respectfully submitted by the Committee of Arrangements and Entertainment,

GEORGE J. SEABURY,
T. J. MACMAHAN,
W. H. ROGERS.

Mr. Macmahan nominated Mr. H. W. Atwood, of New York, as chairman of the Entertainment Committee, and Mr. Seabury moved to amend by nominating Mr. A. J. Schafhirt, of Washington, D. C.

Mr. Brown moved to amend that the chairman be appointed by the President, but, at the request of President Ingalls, withdrew the amendment.

The question being taken on Mr. Seabury's amendment, it was lost by a vote of 10 ayes and 19 nays.

The motion of Mr. Macmahan was then adopted.*

Mr. Kennedy read a paper on Commercial Cream of Tartar, in answer to Query 13, which was accepted and referred (see p. 445).

The chairman of Council called up the amendments to the By-Laws, as suggested in President Thompson's address, and recommended by the Committee on the President's Address.

Mr. Thompson moved to amend Chapter II., Article I., by striking out 600 and inserting in place thereof 750. This was adopted.

Mr. Thompson also moved to amend Chapter VIII., Article VII., by striking out the entire sentence following after the words, "and Treasurer." This was likewise adopted.

Mr. Thompson also moved to amend Chapter IV., Article III., by striking out all following the words, "for three years." This was adopted.

Mr. Ebert moved an amendment to Chapter IV., Article IV., of the By-Laws, which was laid over under the rules. The proposed amendment is to change the figures 500 to 600.

Mr. Menninger read a paper by Mr. H. B. Parsons, on The Water of Hydration in Commercial Sulphate of Quinine, which was accepted and referred (see page 457).

Mr. Biroth read a volunteer paper on A New Poison Case (see page 422), and exhibited one of these cases and explained its arrangement and use.

MR. MENNINGER.—While I agree with Mr. Biroth about the propriety of separating patent medicines and poisons from other drugs and preparations, I am afraid in working up his details he has gone to the other danger, which is as great if not greater than these which have been referred to—the distribution of poisons over the shop. It is the introducing of a new element of danger, where solutions of the British Pharmacopœia differ in strength from those in the United States Pharmacopœia. A formula for morphine solution is in general use. There is a variation also in the strength of the solutions of other medicines. I look at this as being an element of great danger—that of having solutions of drugs of which there is no officinal preparation made. I should approve of solutions being made by the decimal system rather than an arbitrary system. I would call attention to the solutions of strychnine and morphine, as having elements of danger in them.

* On being informed of his election as chairman, Mr. Atwood, being unable to attend to the duties, resigned, whereupon the President appointed Mr. Geo. A. Kelly, of Pittsburg, chairman of the Executive Committee. Mr. Kelly has accepted the appointment, and selected the following four members as his assistants: G. W. Sloan, Indianapolis; Thos. F. Main, New York; T. Roberts Baker, Richmond, Va.; and E. H. Sargent, Chicago, Ill.

MR. BIROTH.—That may be right; but we have no officinal solutions of morphine and strychnine. They are very wisely discarded.

MR. MENNINGER.—Solution of morphine was in general use, and is still officinal in the British Pharmacopœia.

MR. EBERT.—There is no doubt but what much can be done to systematize this subject of keeping poisons more safely than that usually adopted, and I am pleased that Mr. Biroth has brought to our notice his "Poison Case." A method suggested by Mr. Louis Strehl, of Chicago, has impressed me as an unusually good one. It is as follows: Instead of taking any precaution whatever, he has adopted just the opposite. He places the more active remedies, which are usually designated as virulent poisons in one of the drawers of the shop furniture, and which drawer is simply labeled POISON. The remedies are in original bottles, as obtained from the manufacturer or from the druggist, and bear the original label; no attempt is made in having uniformity of appearance of the packages, or having the same kept in the drawer in any order whatever. When a poison is required the drawer is pulled out, and a search has to be made for the particular remedy; this requires a care which is often not exercised when the poisons are kept in regular places and in uniform containers. The more I think of this method, the more I am convinced that it is a superior one in preventing, if adopted, the very serious, and sometimes fatal, errors of mistaking one remedy for another, which from time to time take place in our vocation. I do not make this statement to detract from the merits of the "Poison Case" before us, but to call attention to a method that is directly opposite to what Mr. Biroth has presented.

MR. PRENTICE.—I would like to get the views of the members of this Association on the subject, whether it is feasible to arrange the poisons alphabetically.

MR. REMINGTON.—In regard to the subject just mentioned, I think it is a very important one. I think that the best plan for the arrangement of the bottles on the shelf is to collect the poisons and those which are not poisonous separately, and arrange them alphabetically. An alphabetical arrangement is best, because it is an aid to a new assistant, and to an apprentice. The advantage of the alphabetical arrangement can be utilized, and at the same time the separation of the poisons from others can be effected by classifying the poisons together on a separate shelf. If I were to fit up a new store, I should certainly adopt that arrangement. I remember very distinctly placing my hand at one time in one store on the camphorated tincture of opium, which was labeled Tr. Opii Camph., and alongside of it was another bottle labeled Tr. Sapon. Camph. They were both on the same shelf, one right alongside of the other, and in turning around, my attention being suddenly called away, I quickly picked up the wrong bottle, the last abbreviation, Camph., striking my eye. I soon discovered that I had the wrong bottle, and replaced it. And yet this is the way mistakes are made. A mistake happened in the city of Philadelphia a few years ago owing to an apothecary having a hydrochloric acid bottle by the side of the castor-oil bottle. He supposed that he was dispensing castor oil, when in fact he was dispensing hydrochloric acid in the soda water, and it resulted in death. The arrangement of the bottles on the shelf is therefore an important matter, yet nothing can ever take the place of extreme care.

MR. EBERLE.—At the meeting at Richmond, where the matter came up, an important paper was read upon the subject of poisons. Anything which will lead to the safe dispensing by druggists is important. If you are going to depend upon an arrangement upon the positions of the bottles in the store, you will not prevent mistakes. If, however, when you take up the bottle you think about what you are doing, and you look at the

label and determine in your own mind that it is the medicine, you naturally know the dose of it and how to guard the public against error in its use. But even then there will be mistakes. There are times when a brain can be little depended upon, when its activities are all at fault. I will tell you what we do want. We want to conduct ourselves in such a way that we shall keep this brain clear, and we want plenty of sleep. The pharmacist above every one else should keep himself pure in every respect.

MR. HALLBERG.—Isolation of poisons is the only practical means of preventing mistakes by druggists. An observation of three fatal mistakes that have occurred in this country during the last three years has shown in each instance that the mistake was made by men whose competency was not questioned at all. It was caused by the promiscuous standing around of the quinine bottle and the morphine bottle, morphine being administered in each instance in the place of quinine. It does not matter how the result is obtained, whether by the case of Mr. Biroth or by the method proposed by Mr. Ebert. In regard to the objection raised by Mr. Menninger, I must say that the solutions as proposed by Mr. Biroth, considering that they are to be used by dispenser only with the strength stated on the label, seem to be sufficiently safe for his use. On the other hand, I see no reason why Mr. Biroth should propose dilutions with sugar of the alkaloids, arsenic, and so forth; we have the officinal triturations, which are of a uniform strength of ten per cent., and the diluent, being sugar of milk, serves every purpose. They are officinal, and therefore would be better understood, and at the same time are adapted to the decimal subdivision. Another feature offered in Mr. Biroth's suggestions is difficult to understand. Solutions of the solid extracts in glycerin, water and alcohol are proposed. Why a pharmacist should buy a solid extract or make it himself, and subsequently make a solution of it in glycerin water and alcohol of the strength of twenty-five per cent., is something I cannot understand. It is a step backward. A twenty-five per cent. solution of belladonna extract, provided the extract is of the officinal strength, will be of just the same strength as the fluid extract; and there could not be any advantage gained by making a solution of the solid extract.

MR. THOMPSON.—I suppose that I am like the rest of the gentlemen in the drug business; the longer we are at it, I think, the more we realize the vastness of the danger, and the amount of the responsibility we are under constantly in dispensing medicine. There is not a dose of medicine that goes out of the drug store, which does not carry with it the reputation and perhaps all the man is worth who puts it up. I think that we should be always glad to have suggestions of this sort that add to our security. To guarantee safety, all the more dangerous poisons are separated in my store by having a case somewhat like Mr. Biroth's, with drawers, which drawers bear the names of arsenic, strychnine, atropine, aconitine, morphine, and other articles. They are all kept in separate apartments in this case. But latterly I have adopted another change with regard to the shelves for bottles, which has struck me as being of value. Every pharmacist may try the same experiment of having a separate shelf containing all the poisonous tinctures. Instead of a miscellaneous distribution of poisons among the other stock, the plan is to put them all together on a shelf, and enclosing each bottle by a tin case. These tin cases are made by Sommers Bros., of Brooklyn, and they cost ten cents apiece. They open down low enough so that the label on the bottle is visible, and they allow the bottle to be used without removing the tin case. The case has also a label on the outside the same as the bottle. The fact that the bottle is enclosed in a tin case allows it to be left anywhere. These cases being on the bottles are a notice that the contents are poisonous. These we keep on a separate shelf. The whole expense of getting up two or three dozen bottles only amounts to five or six dollars.

MR. BROWN.—I think this is aiming in the right direction—it is aiming at security

and safety, and any aim in that direction is in the interest of every druggist and of the public. But it does not go far enough. There should be a place for everything, and everything in its right place. As Professor Remington suggested, the camphorated soap liniment next to the camphorated tincture of opium is not just the right place. If druggists will see that the bottles are separated properly so that there can be no mistake in that direction, I think it would be a good plan. Now, the point is to reach this so that the ordinary mind of a dispenser will be attracted in a certain direction, and find what he wants. I think that it is probably immaterial how they are scattered over the store, so that when the article is called for the dispenser can go and get it, whether it is poison or not.

MR. EBERLE.—An arrangement, now frequently seen in selling poisonous drugs, is to put them inside of a box which is labeled, and put in the poison closet, containing strychnine, atropine, and other poisonous alkaloids. The dispenser, going to the closet, is apt to take it for granted that the label on the box is a guarantee of what the box contains. Now in removing these bottles from the boxes, they are frequently misplaced. That has occurred to my knowledge. In some instances a whole bottle of quinine has been dispensed for another article. The mistake was made before the discovery was made that the bottle had been transposed in placing it into one of these boxes. This matter should receive our attention. I think that these boxes should be thrown away, and the bottles should be allowed to stand on their own merits. I am very glad that this discussion came up. Preparations of strong medicines, powerful drugs or narcotic tinctures, should not be placed among other tinctures on the druggist's shelves; nor should bottles containing dry drugs be placed in contiguity with those containing fluids. For instance, Fowler's solution of arsenic should not be placed alongside of tincture of aconite. There is liability of mistake from the classifying of these articles, and in dispensing them the dispenser may hastily take up the wrong bottle. Only a short time ago a mistake of this kind occurred. When I was visiting in the country I went behind the counter in a drug store and I discovered three serious mistakes of this kind within one hour. This is an important subject, and should receive our utmost attention; the matter is vital to us. Any man is liable to make a mistake; but with an intelligent brain and some exertion in the way of arrangement, mistakes may be avoided.

MR. VOGELER.—As far as public expression is concerned, it may be that I am solitary in my position, but I believe that there is a way to prevent mistakes behind the prescription counter. I think that I have been as careful as any one in the profession, but, on the other hand, I always insisted upon the strict alphabetical arrangement, as far as possible, in the arrangement of the store. Concerning mistakes in dispensing, I don't think they are so much attributable to mistakes in reading the labels as to the person's condition of mind. It is not that we take the wrong bottle because we read the label wrong, or from allowing the hand to grasp the wrong bottle. But it depends on what we are thinking about, and what we are not thinking about. There is a story about a learned professor who was discovered by his assistant holding the egg in his hand while his watch was boiling in the pot. That is an ordinary case. To relate something of my own experience: I knew I wanted quinine, but, grasping the morphine bottle, I carefully examined its label, and, *finding it to be morphine*, I felt satisfied, and proceeded to weigh; after taking a second glance at the label, as is my rule, suddenly it flashed through my mind that it was not morphine I desired, but quinine. I had morphine on my brain. This was neither due to ignorance nor inattention, but to the wandering of the mind; and therefore I contend that there is no means of prevention which we may get up that will prove absolutely secure, and will relieve us from mistakes in poisons when the mind has been overworked, which the apothecary is subject to. In respect to

morphine and strychnine, it seems to me that cases of poisoning are less liable to occur from these alkaloids than from a multitude of poisonous substances used in larger quantities. There is no reason why we should not just as well seize the ammonia bottle in place of the morphine bottle, or take aconite for quinine. If we want to go to the extreme of separating all the poisons from other medicines, our poison cases would assume dimensions large enough to include half the drug store, for at least fifty per cent. of the medicines used are poisons.

MR. ELIEL.—I have taken great interest in this discussion on a very important subject. The more definitely and distinctly the store is arranged so far as poisons are concerned, the less liability there will be to make a mistake. We are all more or less liable to make mistakes at certain times, and we don't always feel as bright one time as we do at another. In my experience a definite arrangement has been very convenient for dispensing. I think that convenience is what we need. The greater the convenience, the less liability to make a mistake. Order I think should be made the rule as much as possible. Classification should be adhered to. You must classify everything. I have such an arrangement for the poison case, but not as elaborate as this one before us; but it answers the case very well. I take exceptions to solutions. I don't think we ought to have any solution of morphine prepared, to be used when it is wanted in haste. It is a very dangerous solution. My experience is that such solutions will undergo a change; and if by evaporation the solution of morphine gets stronger, it becomes very dangerous indeed.

MR. BIROTH.—Many would like to know the expense of this case. As the case stands it cost forty dollars. There is a party who will get up the case in large quantities at his factory at the estimated cost of \$8.40, but the labeling will have to be done afterwards.

MR. MENNINGER.—Mr. President, before we dismiss this subject, I want to call attention to an arrangement introduced by one of our most prominent members. All, or at least all the larger bottles, were alphabetically arranged around the store; but the poisonous substances had a different label. There was a uniform arrangement as to shape; the ordinary substances were labeled with white glass labels with gold lettering; while the poisonous substances were designated with white glass labeled with red letters. It made a very marked distinction everywhere a poisonous medicine appeared on the shelves. This manner of arranging the bottles in the shop alphabetically, it strikes me, is one of the best.

MR. OLDBERG.—It seems to me most of the discussion on this subject is rather in favor of some such arrangement as Mr. Biroth has suggested than otherwise. In that case the dry substances and the liquid substances are absolutely separate. The bottles are far apart, and away from the rest of the bottles in the store. We all know that there is danger all around us in a drug store, and we cannot do any more than separate the most violent poisons from the rest of the articles in the store. That is all we can accomplish; otherwise we would have to move the whole store. I wish to correct also a misunderstanding on the part of Mr. Eliel as to a solution of morphine; as I understand Mr. Biroth, his solution contained one grain of the fluid drachm; not one part in eight parts.

MR. NATTANS.—Before closing this discussion, it may be well to give my arrangement. In the discussion Prof. Remington said that he had laid hold of the camphorated tincture of soap when he wanted camphorated tincture of opium. I invariably place a bottle with light-colored contents next to a dark-colored bottle, and that arrangement goes through the store as far as possible, both in liquids as well as in solids. I think it is a step in the direction of preventing an error such as has been mentioned.

MR. ELIEL.—I wish to state with regard to the solution of strychnine, that the strength of the solution was one grain to the fluid drachm. I have endeavored in various ways to preserve such solutions perfect, but I have never been able to succeed. Such a solution is not a permanent one.

MR. REMINGTON.—I think there is a little test here. Mr. Eliel intended to refer to strychnine when he said morphine a few moments ago.

MR. ELIEL.—I meant strychnine.

MR. REMINGTON.—You see how easy it is to make a mistake. (Laughter.)

MR. BIROTH.—The solutions I made have been one drachm in an ounce of water, and they keep perfect for a long time.

MR. EBERT.—I have been very much interested in this discussion, and I hope that we shall have more of such papers. I move that the thanks of this Association be tendered to Mr. Biroth for his volunteer paper.

MR. HALBERG.—I would like to ask whether Mr. Biroth did not employ the sulphate? The alkaloid itself is not soluble to the extent of more than one grain in the drachm.

MR. BIROTH.—It is the sulphate which is almost always prescribed.

Mr. Ebert's motion to tender the thanks of the Association to Mr. Biroth for his paper was agreed to.

Mr. Macmahan offered the following:

Resolved, That the thanks of this Association are due, and are hereby tendered to Henry C. Schranck, Local Secretary, and his co-laborers, for the success attending this meeting.

Resolved, That our thanks are due to the Committee on Entertainment, Messrs. J. L. Lemberger, H. J. Menninger, and Henry C. Schranck, for their able and disinterested efforts in the interest of the members of the Association.

Resolved, That our thanks are due to the members of the press of Milwaukee and Chicago for their excellent reports of the meetings.

The resolutions were adopted; also the following offered by Mr. Lemberger:

Resolved, That the thanks of the Association are due, and are hereby extended to Thomas J. Macmahan, chairman of the Committee on Railroad Transportation, for the excellent arrangements effected with the several railroads for the accommodation of the Association.

The Secretary read a letter from Mr. Carl Doerflinger, inviting the members to visit the Free Public Museum of the City of Milwaukee, located in the southeast wing of the Exposition Building. The invitation was accepted with thanks.

Mr. Remington read a paper by Mr. E. Goebel, on Cinchona Assay, which was accepted and referred (see page 474).

Mr. Biroth read a paper on an article called "Pepsau," and exhibited

an original bottle of it, with label and circular. The paper was referred for publication (see page 420).

MR. SLOAN.—One of my earliest experiences in a drug store was pounding up dry chicken gizzards. This preparation of Eben Owen called "Pepsau" is no doubt the same thing. I think that a pepsin was on the market prior to 1853, or about that time at least.

Mr. Lloyd read a paper entitled "Precipitates in Fluid Extracts," describing experiments made in continuation of those reported in several previous papers (see page 410), and produced strips of blotting paper with which he demonstrated some of the phenomena observed. The paper was accepted with the thanks of the Association.

MR. MENNINGER.—I know that I voice the opinion of nearly every one in this room, that this is probably one of the most important papers that has ever been read before this Society, or before any society having kindred objects. It is pursuing a field which has been opened within the last few years, and it now begins to show its vast extent, which can hardly be foreshadowed, as the results are likely to influence therapeutics and our knowledge of the action of remedial agents on the organs of absorption within the body. This is an important subject for research. I move you, sir, that this paper be received, and that a vote of thanks be tendered to Mr. Lloyd for his valuable paper.

MR. EBERT.—I second the motion, and, in seconding it, I wish to call the attention of the members to the profit to be derived from having such papers read, instead of uselessly taking up the time in discussing entertainments.

MR. HALLBERG.—I second that motion also, and in doing so I would like to say that these are the objects which bring the members of the Association together.

MR. LLOYD.—While carrying on these investigations, I consulted Professor Scheffer, who kindly went over these facts. His report is here, and if it be the desire of the Association it may be read.

THE SECRETARY.—I hold in my hands, Mr. President, the letter from Prof. Scheffert which I have not had the time to read; but before reading it to the Association I desire to say that I have read Mr. Lloyd's paper carefully before; and, while I was struck with many of his experiments, it occurred to me very forcibly that perhaps every one of us has noticed some of these little things, but our minds were not inquisitive enough to endeavor to solve the problem. In following up these little matters, Prof. Lloyd has gone so far as to filter distilled water from a saline solution, that is, to separate the water without evaporating it, which is certainly quite an achievement. Dating his letter Louisville, August 24, 1885, Prof. Scheffer remarks as follows:

"Of particular interest seemed to me, the discriminating action in a solution of different salts, whereby the solutions became disassociated—a phenomenon that cannot be explained by capillary attraction alone. I do not want, and cannot give, an explanation of this fact, but will give you, nevertheless, the course of my ideas and my subsequent experiments:

"All porous substances show capillary attraction; and supposing that mineral substances had no discriminating effect, but would attract different salts in solution with equal force, I was inclined at first to ascribe the disassociation of the mixed solution to a kind of endosmotic action, at least to the vegetable fibre.

"We know that living plants absorb from the water in the soil one salt in preference to another, and experiments which had been made by a botanist (I forget his name) with a solution containing ammonium chloride and potassium nitrate, into which he placed different living plants, showed that one plant extracted more chloride ammonium, while another took up more nitrate potassium. These experiments, of course, are not analogous to yours, as in your case there is no living plant in action; but we have in the blotter an organized body, as the vegetable cell has not been destroyed in the manufacture of paper."

"These were my ideas, and I concluded that the cell membrane had discriminating influence on different salts, so that one salt could be absorbed easier and quicker than another one.

"But I was surprised, when repeating your experiments with porous mineral substances, to find that here also a discriminating absorption took place.

"The experiments were made with solutions exactly of the nature and strength you mention in your paper.

"I prepared cylindrical sticks of sulphate of calcium, by pouring a liquid paste, made from plaster Paris with water, into proper moulds. These sticks, thoroughly dried, were inserted in the solutions, and left for an hour or more until the liquid had ascended to a proper height, sufficient for clear results and tests.

"The results, although in the main part similar to those obtained with blotter-sheets, differ from them nevertheless.

"In the mixed solutions the cupric sulphate ascended in all cases higher than the ferric salt, but the ferrous salt did not overtop the cupric salt, as is the case in the blotter-experiments, and in some cases did not reach as high as the cupric salt. The same was the case in an experiment with a solution containing only cupric and ferrous sulphate.

"(On examining the plaster Paris, I found it to contain carbonate of calcium, which might have been the cause of retarding the absorption of ferrous sulphate by converting it partially into ferrous carbonate. Time was too short to make experiments to that effect, or try it with other material.

"The saltless region to which liquid had ascended above the height where the tests commenced to indicate, was comparatively smaller, and the boundaries of the different salts were not as sharply defined as in the blotter-experiments, but seemed to run into each other."

MR. VOGELER:—It is not my desire to detract one iota from the great value of Prof. Lloyd's labors, but I think I ought to correct an error in regard to some remarks made by Prof. Maisch. I think that it was well known to chemists of the previous century, if not long before, that water can be separated from saline solutions by just such a method as has been described. The apparatus was something in the shape of a cow's tongue, the wider end of the tongue being placed in the liquid, and in this way they managed to separate the clear water, leaving the saline matter behind.

Mr. Seabury offered the following resolutions, which were adopted:

Resolved, That hereafter the debates and discussions on other than strictly pharmaceutical subjects shall be omitted in our annual reports.

Resolved, That the Committee be instructed to forward with the usual annual solicitation for new members a copy or reprint of the Association's arrangements and entertainments for the meeting at Pittsburg, in 1885.

Mr. Oldberg moved that exhibitors be hereafter notified, through the

circular invitations sent to them, that the exhibition room will be closed during the sessions of the Association.

After some discussion, the motion was carried.

Mr. Remington read a paper by Mr. Maclagan, on Mercurous and Mercuroso-mercuric Iodide, which was accepted and referred (see page 442).

Mr. Ebert read a paper in answer to Query 36, by Prof. O. A. Wall, on the propriety of physicians ordering the preparations of certain manufacturers, which was referred for publication (see page 428). Some of the views advocated were opposed by Mr. Vogeler.

MR. HAILBERG.—If I understand the situation, I do not think it is necessary to be reminded of the fact that the statements made in the paper describing the pharmacists, don't apply to the members of this Association, but that they may be applied with great force to a great many of the so-called druggists throughout the country. Where are we going to draw the line? I do not know who does or who does not understand his business. The profession of pharmacy is conducted purely as a matter of confidence; therefore, when a physician has confidence in a certain pharmacist he is entitled to stand by his goods and his preparations unless he knows that another pharmacist where his prescriptions go is equally reliable, and keeps his goods up to the standard strength. Pharmaceutical preparations generally are sold at wholesale because they are cheap. This is a well-known fact, though some of them, I think, are worthless. The name which the label indicates is usually well known; and while we, as pharmacists, don't profess to delegate to the medical profession the right to dictate what preparation we should use, yet at the same time they are entitled to our respect for the judgment which they show, and the wisdom they exercise in regard to certain classes of preparations.

Mr. Klein read a portion of the report on the drug market, more particularly that relating to quinine. The report was accepted and referred (see page 348).

A paper by Mr. Colcord, giving a history of rhubarb, and some notes on its cultivation, was read by title, and referred (see page 463).

Mr. Bedford read a paper by Mr. Martin, on Plasters, as a partial answer to Query 26 (see page 421).

Mr. Sloan read a paper by Mr. C. W. Phillips, on Emulsion of Copaiva containing Pepsin and Tincture of Iron (see page 419).

Mr. Bedford read a paper by Mr. H. Maclagan, describing a modification in executing Kerner's test. (See page 161.) Also a paper by Mr. Parsons on the practicability of Kerner's test. (See page 458.)

Mr. Lloyd read a paper by Dr. A. W. Miller on artificial oil of wintergreen. (See page 473.) Also a paper by Mr. G. C. Simms, entitled Cleanliness in Pharmacy. (See page 426.)

The several papers were duly accepted and referred for publication.

Mr. Tufts, on behalf of the nominating committee, proposed Mr. George A. Kelly as Local Secretary for the next annual meeting. On motion of Mr. Sloan, the Secretary was directed to deposit an affirmative

ballot for Mr. Kelly, which having been done, Mr. Kelly was declared to be the Local Secretary for the ensuing year.

The Secretary read the minutes of the fifth session, which, on motion, were approved.

On motion of Mr. Tufts, the Association then adjourned to meet again at Pittsburgh, Pa., on the second Tuesday of September, 1885.

At a meeting held by the Council, after the final adjournment of the Association, the following amendment to the By-Laws, which could not be prepared by the sub-committee in time for being reported at the fifth session, was considered, and directed to be reported, with a favorable recommendation, to the next meeting of the Association as an addition to Chapter IX., Article IV., of the By-Laws:

One hour after the opening of each session subsequent to the second session, the report of the Committee on Papers and Queries shall be in order, and no other business shall be considered, except by unanimous consent: *Provided*, That this shall not prohibit the Association from holding special sessions for the consideration of particular subjects.

JOHN M. MAISCH, *Permanent Secretary*.

Most of the members attending the Thirty-second Annual Meeting reached Chicago on Saturday evening or Sunday morning, August 23d or 24th, and, after enjoying a day's rest, reached Milwaukee on Monday morning. The Railroad Committee had secured quite favorable terms for the members and their families. The headquarters were at the Plankinton Hotel, in the arcades of which a reception was held, a hop was indulged in, and a vocal and instrumental concert was given by Misses Fuller, Geiser, Hardy, and Heine, Mr. H. F. Fuller, Mr. L. Heine, and the Heine Quartette, the music and singing affording a rare treat. Wednesday afternoon was set apart for a carriage drive through various parts of Milwaukee and the surrounding country, and several industrial establishments were visited, prominent among which were the large breweries for which the Cream City is famed. On Thursday evening, a comic opera at Schlitz's park was the attraction, followed by a collation; and on Friday afternoon a steamboat excursion on Lake Michigan terminated the programme which had been laid out by the Entertainment Committee, the Local Secretary, and the Local Committee. After the adjournment, numerous parties extended their trips to different lakes, to Waukesha, to Tonyawathee on Lake Monona, near Madison, where the University of Wisconsin is located, to the dells of Wisconsin, to Saint Paul, Minneapolis, and other places of interest.

LIST OF COLLEGES AND ASSOCIATIONS

HAVING ACCREDITED DELEGATES TO THE THIRTY-SECOND ANNUAL MEETING,
WITH THE ADDRESSES OF THEIR PRESIDENTS AND SECRETARIES.

COLLEGES OF PHARMACY.

	<i>Presidents.</i>	<i>Secretaries.</i>
Chicago.	Thos. Whitfield	S. L. Coffin.
Cincinnati		Chas. G. F. Fennel.
Louisville	Emil Scheffer	Fred. G. Miller.
Massachusetts (Boston)	Henry Canning	W. F. Sawyer (Boston).
National (Washington, D. C.)	G. G. C. Simms.	J. R. Walton.
New York.	Ewen McIntyre	Chas. Froebel.
Ontario (Toronto)	Neil C. Love	Geo. Hodgetts.
Philadelphia	Chas. Bullock	Wm. B. Thompson.
St. Louis	H. E. Hoelke	W. C. Bolm.

STATE PHARMACEUTICAL ASSOCIATIONS.

	<i>Presidents.</i>	<i>Secretaries.</i>
Arkansas	J. B. Bond, Little Rock	J. R. Colburn, Little Rock.
Connecticut	W. R. Francis, New Haven	F. Wilcox, Waterbury.
Georgia.	S. C. Durban, Augusta.	I. Zacharias, Savannah.
Illinois	H. LeCaron, Braidwood	T. H. Patterson, Chicago.
Indiana	W. L. Johnston, Evansville	J. R. Perry, Indianapolis.
Iowa	W. C. McBride, Marshalltown	E. L. Boerner, Iowa City.
Kansas	W. C. Johnston, Manhattan	J. T. Moore, Lawrence.
Kentucky	Jeff. Oxley, Nicholasville	J. F. Cook, Harrodsburg.
Louisiana	R. N. Girling, New Orleans	Ben Lewis, New Orleans.
Maryland		M. L. Beyers, Hagerstown.
Massachusetts		J. W. Colcord, Lynn.
Michigan	Fr. Wells, Lansing	Jac. Jesson, Muskegon.
Mississippi	J. W. Eckford, Aberdeen	H. F. West, Fayette.
Nebraska	N. A. Kuhn, Omaha	H. H. Whittlesey, Crete.
New Hampshire	F. H. Chapman, Franklin Falls	G. F. Underhill, Concord.
New Jersey	A. P. Brown, Camden.	R. H. Vansant, Trenton.
New York	W. H. Rogers, Middletown	C. W. Holmes, Elmira.
Ohio	John Weyer, Cincinnati	L. C. Hopp, Cleveland.
Pennsylvania	C. H. Cressler, Chambersburg	J. A. Miller, Harrisburg.
Rhode Island		H. J. Leith, Providence.
Texas	E. M. Wells, Fort Worth	J. H. Bradley, Taylor.
Virginia	W. A. Strother, Lynchburg	C. R. Beckwith, Petersburg.
West Virginia	C. M. Shrewsbury, Parkersburg	C. Menkemeller, Wheeling.
Wisconsin.	E. Summer, Madison	E. B. Heimstreet, Janesville.

LOCAL PHARMCEUTICAL ASSOCIATIONS.

*Presidents.**Secretaries.*

Cleveland, O.	J. H. Peck, Cleveland	A. Mayell, Cleveland.
Davenport, Iowa		H. Lerchen, Davenport.
Detroit, Mich.	A. B. Stevens, Detroit.	A. McFarland, Detroit.
Indianapolis, Ind.		H. C. Pomeroy, Indianapolis.
Kings County, N. Y.		C. R. Paddock, Brooklyn.
Lancaster County, Pa.	H. B. Parry, Lancaster	A. A. Hubley, Lancaster.
Lynn, Mass.		C. F. Bulfinch, Lynn.
Orleans, La.	Wm. Graner, New Orleans	L. C. Tebo, New Orleans.
Richmond, Va.	Hugh Blair, Richmond	Jos. Anthony, Richmond.
St. Joseph County, Mo.		C. G. Morris, South Bend.

ALUMNI ASSOCIATIONS OF COLLEGES OF PHARMACY.

*Presidents.**Secretaries.*

Albany	L. H. Wheeler, Albany	F. M. Clement, Albany.
Louisville.	W. F. Tafel, Louisville	P. Schlosser, Louisville.
Massachusetts (Boston)	G. M. Hoyt, Boston.	J. H. Greer, Boston.
Philadelphia.	C. A. Weidemann, Philadelphia	W. E. Krewson, Philadelphia.
St. Louis	W. C. Bolm, St. Louis	H. F. Hassebrock, St. Louis.

LIST OF PUBLICATIONS RECEIVED

FOR THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Societies and editors are respectfully requested to forward all publications intended for the American Pharmaceutical Association to the Permanent Secretary. European exchanges, if not sent by mail, will reach us through the Smithsonian Institution at Washington.

JOHN M. MAISCH,

143 North Tenth Street, Philadelphia, Pa.

American Druggist, New York, 1884.

Deutsch-Amerikanische Apotheker Zeitung, New York, 1884.

Oil, Paint, and Drug Reporter, New York, 1884.

Pharmaceutical Record, 1884.

Pharmaceutische Rundschau, 1884.

The Druggists' Circular, 1884.

Weekly Drug News, New York, 1884.

American Journal of Medical Sciences, Philadelphia, 1884.

American Journal of Pharmacy, Philadelphia, 1884.

Transactions of the College of Physicians of Philadelphia, 1884.

The Pharmacist, Chicago, 1884.

The Western Druggist, Chicago, 1884.

The National Druggist, St. Louis, 1884.

Transactions of the Academy of Science of St. Louis, IV., No. 3.

Pacific Medical and Surgical Journal, San Francisco, 1884.

The Canadian Pharmaceutical Journal, Toronto, 1884.

Pharmaceutical Journal and Transactions, London, 1884.

Yearbook of Pharmacy and Transactions of the British Pharmaceutical Conference, 1884.

Calendar of the Pharmaceutical Society of Great Britain, 1884.

The Chemist and Druggist, London, 1884.

The Chemists' and Druggists' Diary, 1885.

Proceedings of the Philosophical Society of Glasgow, XIV., XV.

Archiv der Pharmacie, Halle, 1884.

Zeitschrift des Allgemeinen Oesterreichischen Apotheker-Vereines. Wien, 1884.

Anzeiger der K. K. Akademie der Wissenschaften. Wien, 1884.

Sitzungsberichte der K. B. Akademie der Wissenschaften, 1883, 1, 2, 3.

Ueber die Methoden in der systematischen Botanik, von Ludwig Radlkofer.

Nachrichten von der K. Gesellschaft der Wissenschaften zu Göttingen, 1883.

Schweizerische Wochenschrift für Pharmacie, 1884.

Annual Report of the Mercantile Library Company of Philadelphia, 1883.

Annual Report of the Astor Library Company of the City of New York, 1883.

Report of the Trustees of the New York State Library, 1883.

Calendar of the University of Michigan for 1884.

Annual Report of the President to the Corporation of Brown University, 1883.

Catalogue of the University of Vermont and State Agricultural College, 1883.

Proceedings of the New Jersey Pharmaceutical Association, 1884.

Proceedings of the Kentucky Pharmaceutical Association, 1883, 1884.

Index Catalogue of the Library of the Surgeon-General's Office U. S. A., Vol. V.

Proceedings of the American Academy of Arts and Sciences, New Series XI., Parts I., II.

Transactions of State Medical Societies for 1884: Michigan, Minnesota, South Carolina.

LIST OF SOCIETIES, LIBRARIES, JOURNALS, AND INDIVIDUALS.

TO WHOM COMPLIMENTARY COPIES OF THE PROCEEDINGS OF THIS ASSOCIATION ARE
FORWARDED.

The State Libraries of all the States in the Union except Connecticut.		
Maine Insane Asylum,	Augusta,	Maine.
Bowdoin College,	Brunswick,	"
Dartmouth College,	Hanover,	New Hampshire.
New Hampshire Medical Society, Dr. G. P. Conn, Sec-		
retary,	Concord,	"
Amherst College,	Amherst,	Massachusetts.
Harvard University,	Cambridge,	"
Massachusetts College of Pharmacy,	Boston,	"
American Academy of Arts and Sciences,	"	"
Boston Athenæum,	"	"
City Library,	"	"
City Hospital,	"	"
Massachusetts General Hospital,	"	"
Medical Library Association,	"	"
University of Vermont,	Burlington,	Vermont.
Brown University,	Providence,	Rhode Island.
Connecticut Medical Society, C. W. Chamberlain, M. D.,	Hartford,	Connecticut.
Medical Journal and Library Association,	"	"
Trinity College,	"	"
Silas Bronson Library,	Waterbury,	"
Yale College,	New Haven,	"
College of Pharmacy of the City of New York,	New York,	New York.
Literary and Scientific Society of German Apothecaries,	"	"
American Druggist,	"	"
Deutsch-Americanische Apotheker Zeitung,	"	"
Druggists' Circular,	"	"
Oil, Paint, and Drug Reporter,	"	"
Pharmaceutical Record,	"	"
Pharmaceutische Rundschau,	"	"
Weekly Drug News,	"	"
Astor Library,	"	"
Mercantile Library,	"	"
Long Island Historical Society,	Brooklyn,	"
New Jersey State Lunatic Asylum,	Trenton,	New Jersey.
Philadelphia College of Pharmacy,	Philadelphia,	Pennsylvania.
Academy of Natural Sciences,	"	"
American Journal of Medical Sciences,	"	"

American Philosophical Society,	Philadelphia, Pennsylvania.
College of Physicians,	" "
Franklin Institute,	" "
Mercantile Library,	" "
Pennsylvania Hospital,	" "
Philadelphia Library,	" "
Pittsburgh College of Pharmacy,	Pittsburgh, "
Maryland College of Pharmacy,	Baltimore, Maryland.
Maryland Academy of Sciences,	" "
University of Maryland,	" "
National College of Pharmacy,	Washington, District Columbia.
Bureau of Education,	" "
Congressional Library,	" "
Department of Agriculture,	" "
Library of the American Medical Association,	" "
Smithsonian Institution,	" "
Surgeon-General, United States Army,	" "
Surgeon-General United States Marine Hospital Service,	" "
Surgeon-General, United States Navy,	" "
United States Patent Office,	" "
Richmond Pharmaceutical Association,	Richmond, Virginia.
South Carolina Medical Association, Dr. H. D. Fraser,	
Secretary,	Charleston, South Carolina.
Louisville College of Pharmacy,	Louisville, Kentucky.
Cincinnati College of Pharmacy,	Cincinnati, Ohio.
Cincinnati Academy of Medicine,	" "
Mussey Medical Library,	" "
Longview Asylum,	Carthage, Hamilton county, O.
University of Michigan,	Ann Arbor, Michigan.
Michigan State Medical Society, Dr. G. E. Ranney, Sec-	
retary,	Lansing, "
Chicago College of Pharmacy,	Chicago, Illinois.
The Western Druggist,	" "
Illinois State Medical Society, Dr. S. J. Jones, Secretary,	" "
St. Louis College of Pharmacy,	St. Louis, Missouri.
Academy of Science of St. Louis,	" "
National Druggist,	" "
St. Louis Mercantile Library,	" "
St. Louis Public School Library,	" "
University of Wisconsin,	Madison, Wisconsin.
Kansas State University,	Lawrence, Kansas.
Minnesota State Medical Society, C. H. Boardman, M.	
D., Secretary,	St. Paul, Minnesota.
California College of Pharmacy,	San Francisco, California.
Pacific Medical and Surgical Journal,	" "
Montreal College of Pharmacy, Montreal, Canada.	
Ontario College of Pharmacy, Toronto, Canada.	
Pharmaceutical Department, Halifax Medical College, Nova Scotia.	
Escuela de Farmacia, Mexico.	
Sociedad Medico farmaceutico, Merida, Yucatan.	
Sociedad de Farmacia Argentina, Buenos Ayres.	

British Pharmaceutical Conference, London.

Pharmaceutical Society of Great Britain, London, 17 Bloomsbury Square.

Pharmaceutical Journal and Transactions, London.

Chemical News, London, Boy Court, Ludgate Hill, E. C.

Chemist and Druggist, London, 44 Cannon Street.

British Museum, London.

Philosophical Society, Glasgow.

Liverpool Chemists' Association.

Association of Chemists and Druggists, Wolverhampton.

Coventry and Warwickshire Pharmaceutical Association, Coventry.

Pharmaceutical Society at Edinburgh, 36 York Place.

Pharmaceutical Society of Ireland, Dublin.

Nederlandsche Maatschappij ter bevordering der Pharmacie, Jacobus Polak, Secretary,
Amsterdam.

Académie Royale de Médecine de Belgique, Bruxelles.

Société de Pharmacie Royale de Bruxelles.

Société Royale des Sciences Médicales et Naturelles, Bruxelles.

Société de Pharmacie d'Anvers.

Société de Pharmacie, Paris.

Répertoire de Pharmacie, Paris.

Schweizerische Wochenschrift für Pharmacie, A Klunge, Aubonne.

Zeitschrift d. Allg. Oesterreichischen Apotheker-Vereins, Wien.

K. K. Gesellschaft der Aerzte, Wien.

K. Akademie der Wissenschaften, Wien.

K. Bayer, Akademie der Wissenschaften, München.

Pharmaceutisches Institut, Universität Erlangen.

Universität Strassburg.

Journal de Pharmacie d'Alsace-Lorraine, N. Nicklès, Benfeld.

Archiv der Pharmacie, Waisenhausbuchhandlung, Halle.

K. Akademie der Wissenschaften, Göttingen.

Pharmaceutische Zeitung, Bunzlau.

Pharmaceutische Gesellschaft in St. Petersburg, St. Petersburg.

Pharmaceutisches Institut, Dorpat, Russia.

Pharmaceutical Institution, Stockholm, Sweden.

Kongelige Norske Universitet i Christiani.

Archiv for Pharmacie, S. M. Trier, Kjobenhavn.

Denmark's Apotheker Forening, Gust. Lodze, President, Odense.

R. Biblioteca Nazionale, Firenze, Italy.

Archivio di Farmazia, Roma, Italy.

Pharmaceutical Society of Victoria, Melbourne, Australia.

Pharmaceutical Society of New South Wales, Sydney.

Pharmaceutical Society of New Zealand, Auckland.

CONSTITUTION AND BY-LAWS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION.

CONSTITUTION.

ARTICLE I. This Association shall be called the "American Pharmaceutical Association." Its aim shall be to unite the educated and reputable Pharmacists and Druggists of America in the following objects:

1. To improve and regulate the drug market, by preventing the importation of inferior, adulterated, or deteriorated drugs, and by detecting and exposing home adulteration.

2. To encourage proper relations between Druggists, Pharmaceutists, Physicians, and the people at large, which shall promote the public welfare, and tend to mutual strength and advantage.

3. To improve the science and art of Pharmacy by diffusing scientific knowledge among Apothecaries and Druggists, fostering pharmaceutical literature, developing talent, stimulating discovery and invention, and encouraging home production and manufacture in the several departments of the drug business.

4. To regulate the system of apprenticeship and employment, so as to prevent, as far as practicable, the evils flowing from deficient training in the responsible duties of preparing, dispensing, and selling medicines.

5. To suppress empiricism, and to restrict the dispensing and sale of medicines to regularly educated Druggists and Apothecaries.

6. To uphold standards of authority in the Education, Theory and Practice of Pharmacy.

7. To create and maintain a standard of professional honesty equal to the amount of our professional knowledge, with a view to the highest good and greatest protection to the public.

ARTICLE II. This Association shall consist of active, life, and honorary members, and shall hold its meetings annually.

ARTICLE III. The officers of the Association shall be a President, three Vice-Presidents, a Permanent Secretary, a Local Secretary, a Treasurer, and a Reporter on the Progress of Pharmacy, all of whom, with the exception of the Permanent Secretary, shall be elected annually, and shall hold office until an election of successors.

ARTICLE IV. All moneys received from life membership, together with such funds as may be bequeathed, or otherwise donated to the Association, shall be invested by the Treasurer in United States Government or State securities, the annual interest of which only shall be used by the Association for its current expenses.

ARTICLE V. Every proposition to alter or amend this Constitution shall be submitted in writing, and may be balloted for at the next Annual Meeting; when, upon receiving the votes of three-fourths of the members present, it shall become a part of this Constitution.

BY-LAWS.

CHAPTER I.

Of the Presidents and Vice-Presidents.

ARTICLE I. The President shall preside at all meetings of the Association; in his absence or inability, one of the Vice-Presidents, or in the absence of all, a President *pro tempore*, shall perform the duties of President.

ARTICLE II. He and the Vice-Presidents shall be *ex-officio* members of the Council.

ARTICLE III. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*.

ARTICLE IV. In meetings the President shall take the chair at the proper time; announce all business; receive all proper motions, resolutions, reports, and communications, and order the vote upon all proper questions at the proper time.

ARTICLE V. In all ballotings, and on questions upon which the ayes and nays are taken, the President is required to vote, but his name shall be called last; in other cases he shall not vote, unless the members be equally divided, or unless his vote, if given to the minority, will make the decision equal, and in case of such equal division, the motion is lost.

ARTICLE VI. He shall enforce order and decorum; it is his duty to hear all that is spoken in debate, and in case of personality or impropriety, he shall promptly call the speaker to order. He shall decide all questions of order, subject to the right of appeal, unless in cases where he prefers to submit the matter to the meeting; decide promptly who is to speak when two or more members rise at the same moment, and be careful to see that business is brought forward in proper order.

ARTICLE VII. He shall have the right to call a member to the chair, in order that he may take the floor in debate. He shall see that the Constitution and By-laws are properly enforced.

ARTICLE VIII. He shall appoint all committees, unless provided for in the By-laws, or otherwise directed by the Association.

ARTICLE IX. He shall sign the certificates of membership, and countersign all orders on the Treasurer. He shall obey the instructions of the Association, and authenticate by his signature, when necessary, its proceedings.

ARTICLE X. He shall present at each Annual Meeting an address, embodying general scientific facts and events of the year, or discuss such scientific questions as may to him seem suitable to the occasion.

CHAPTER II.

Of the Permanent Secretary.

ARTICLE I. The Permanent Secretary shall be elected to hold office permanently during the pleasure of the Association. He shall receive from the Treasurer an annual salary of \$750, and the amount of his expenses incident to the meeting in addition to his salary.

ARTICLE II. He shall preserve fair and correct minutes of the proceedings of the meetings, and carefully preserve, on file, all reports, essays, and papers of every description received by the Association, and shall be charged with the necessary foreign and scientific correspondence, and with editing, publishing, and distributing the Proceedings of the Association, under the direction of the Council.

ARTICLE III. He shall read all papers handed him by the President for that purpose; shall call and record the ayes and nays, whenever they are required to be called; shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues, and stating the business upon which the committee is to act; and shall notify every member of the time and place of each Annual Meeting.

ARTICLE IV. He shall be, *ex-officio*, a member of the Council.

CHAPTER III.

Of the Local Secretary.

ARTICLE I. The Local Secretary shall be elected annually, near the close of the Annual Meeting, and shall reside at or near the place where the next Annual Meeting of the Association is to be held.

ARTICLE II. He shall assist the Permanent Secretary in his duties; shall co-operate with the Council and any local committee in making arrangements for the Annual Meeting; shall correspond with the chairmen of the several committees, and with other members, in advance of the meeting for the promotion of its objects, and shall have the custody of specimens, papers, and apparatus destined for use or exhibition at the meetings.

CHAPTER IV.

Of the Treasurer.

ARTICLE I. The Treasurer shall collect and take charge of the funds of the Association, and shall hold, sign, and issue the certificates of membership.

ARTICLE II. He shall pay no money except on the order of the Secretary, countersigned by the President, and accompanied by the proper vouchers.

ARTICLE III. He shall report to the Council, previous to each Annual Meeting, the names of such members as have failed to pay their annual contributions for three years.

ARTICLE IV. He shall present a statement of his accounts at each Annual Meeting of the Council, that they may be audited; he shall receive an annual salary of \$500, and the amount of his expenses incident to the meeting, in addition to his salary.

CHAPTER V.

Of the Reporter on the Progress of Pharmacy.

ARTICLE I. The Reporter on the Progress of Pharmacy shall be elected annually, and shall receive from the Treasurer for his services such sum as may be annually determined upon by the Council.

ARTICLE II. All journals and volumes received in exchange for the Proceedings by the Permanent Secretary, and such other journals as shall be deemed necessary, shall be sent to him by that officer for use in the compilation of his report; for all of which he shall be held responsible until returned to the Permanent Secretary for preservation.

ARTICLE III. From these and other available sources, he shall prepare a comprehensive report on the improvements and discoveries in Pharmacy, Chemistry, and Materia Medica, and the collateral branches of knowledge; on the changes in conditions of Pharmaceutical Institutions; together with such statistical, biographical, and obituary notices as will furnish an epitome of the progress and changes in the science and practice of Pharmacy, and of its votaries, at home and abroad.

ARTICLE IV. The Report on the Progress of Pharmacy shall commence with July 1st of the preceding year, and end with June 30th of the year in which it is submitted; shall be written in a form fitted for the printer, and shall be presented completed at the Annual Meeting.

ARTICLE V. In case of the illness or other inability of the Reporter to carry on the work of the report, the Permanent Secretary and the Chairman of the Council shall be required to make the best arrangements they can command to continue the work to its completion.

CHAPTER VI.

Of the Council.

ARTICLE I. The business of the Association which is not of a scientific character shall be in charge of a Council, which shall be empowered to transact business for the Association between the times of meeting, and to perform such duties as may from time to time be committed to them by the Association; their acts, however, being subject to revision by the Association.

ARTICLE II. The Council shall consist of seventeen members, nine of whom shall be elected by ballot by the Association, in the following manner: Three of them to serve for one year, three for two years, three for three years. At each subsequent Annual Meeting, three members shall be elected to take the places of those whose terms will then expire, to serve for the term of three years.

ARTICLE III. The President, Vice-Presidents, Secretary, Local Secretary, Treasurer, and Reporter on the Progress of Pharmacy of the Association, shall be *ex-officio* members of the Council.

ARTICLE IV. Vacancies which may occur in the Council shall be filled for the unexpired term or terms by the Association at its next annual meeting.

ARTICLE V. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, to be elected by ballot annually by the Council.

ARTICLE VI. The Council shall be charged with the examination of the credentials of delegates, and the transaction of unfinished business of the Association, from one Annual Meeting to another, and with collecting, arranging, and expediting the business of the Association during the sessions of the Annual Meeting.

ARTICLE VII. There shall be elected annually by ballot, by the Council, three standing committees of the Council—a Committee on Membership, a Committee on Publication, and a Committee on Finance.—to whom shall be referred such duties as are appropriate to their respective functions, as the Council shall direct; they shall report annually to the Council, and at such other times as the Council may direct.

ARTICLE VIII. *Section 1.* The Council shall have charge of the revision of the roll and the publication of the Proceedings.

Section 2. The Secretary of the Council shall read at one session of the Association the names of those candidates for membership which have been approved by the Committee on Membership, and the applicants shall be balloted for at the next session of the Council by the members present, when a vote of two-thirds shall be sufficient to elect them.

Section 3. The Council shall decide upon any objections which may be presented to them (which must be in writing with the member's name attached), referring to the fitness of the candidates for membership; and no name shall be balloted for without first receiving the approval of the Council.

Section 4. The Committee on Membership shall report at each annual meeting of the Council a revised roll of members, with appropriate notices of deceased members.

ARTICLE IX. The Council shall furnish to each member of the Association not in arrears one copy of the annual publication of the Proceedings, which publication shall contain the correct roll of members, full minutes of the several sittings of the Association, a complete synopsis of the minutes of the Council, the reports of the President and committees, together with such addresses, scientific papers, discussions, notices of new processes and preparations, as they may deem worthy of insertion, and shall fix the price at which the Proceedings shall be sold.

CHAPTER VII.

Of Committees.

ARTICLE I. There shall be elected annually four standing committees: A Committee on the Drug Market, to consist of five members; a Committee on Papers and Queries, a Committee on Prize Essays, and a Committee on Legislation, each to consist of three members.

ARTICLE II. The Committee on the Drug Market shall report annually the condition of the Drug Market, the fluctuations in the supply and demand of drugs and chemicals, the variations in quality, and the adulterations and sophistications coming under their observation or reported to them by others, with any suggestions or recommendations for the improvement or better regulation of the trade; and they shall be authorized to report upon any adulterations and sophistications of immediate interest, through the Pharmaceutical Journals, as soon as practicable after their discovery.

ARTICLE III. The Committee on Papers and Queries shall report, near the close of each Annual Meeting, a proper number of questions of scientific and practical interest,

the answers to which may advance the interest of Pharmacy, and shall procure the acceptance of as many such questions for investigation as may be practicable.

ARTICLE IV. Any person writing a paper for the Association must, to insure its publication in the Proceedings, refer the same, with a synopsis of its contents, to the Committee on Papers and Queries previous to the third session.

ARTICLE V. It shall be the duty of every Standing Committee making a report annually to the Association, in like manner to furnish a copy of the same, together with a synopsis of its contents, to the Committee on Papers and Queries, before the first annual session of the Association.

ARTICLE VI. The Committee on Prize Essays shall, within six months after the Annual Meeting at which the essays are presented, determine which, if any of them, has met the requirements of the founder of the prize. In all other respects they shall be governed by the stipulations expressed by the donor. The decision of the committee, with such comments upon the successful essay only as they may deem proper, may be published in the Journals of Pharmacy.

ARTICLE VII. The Committee on Legislation shall keep a record of, and compile for reference, the enactments of the different States regulating the practice of pharmacy and the sale of medicines. They shall report to each stated meeting of the Association what legislation on the subject has occurred during the year.

CHAPTER VIII.

Of Membership.

ARTICLE I. Every pharmacist and druggist of good moral and professional standing, whether in business on his own account, retired from business, or employed by another, and those teachers of Pharmacy, Chemistry, and Botany, who may be specially interested in Pharmacy and Materia Medica, who, after duly considering the objects of the Association, and the obligations of its Constitution and By-Laws, are willing to subscribe to them, are eligible to membership.

ARTICLE II. Any person eligible to membership may make application in writing, with the indorsement of any two members of the Association in good standing, to any member of the Council, who shall report his application to the said Council.

ARTICLE III. No person shall be a member of this Association, nor shall his name be placed upon the roll, until he shall have signed the Constitution and paid into the Treasury the sum of *Five Dollars* as an initiation fee, and the annual contribution for the current year, which sums must accompany the application.

ARTICLE IV. Every member shall pay in advance to the Treasury the sum of *Five Dollars* as his yearly contribution, and is liable to lose his membership by neglecting to pay said contribution for *three successive years*.

ARTICLE V. Any member not in arrears to the Association, who shall pay to the Treasurer the sum of \$75 during the first year of his connection therewith, or after five years \$70, or after ten years \$60, or after fifteen years \$50, or after twenty years \$40, shall become a life-member, and shall be exempt from all future annual contributions.

ARTICLE VI. All local organizations of Pharmacists shall be entitled to *five* delegates, as their representatives in the Annual Meetings, who, *if present*, become members of the

Association on signing the Constitution and paying the annual contribution for the current year and the usual initiation fee : Provided, that the provisions of this article shall not be so construed as to reinstate any member whose name may have been dropped from the roll for non-payment of dues ; nor shall any one who has been expelled from the Association be received as a delegate. All credentials should be sent to the Permanent Secretary *at least two weeks* in advance of the Annual Meeting.

ARTICLE VII. Members shall be entitled, on the payment of *Five Dollars*, to receive from the Treasurer a certificate of membership signed by the President, one Vice-President, Permanent Secretary, and Treasurer.

ARTICLE VIII. Persons constitutionally elected to membership become permanent members, and their membership can cease only by resignation, non-payment of dues, or by expulsion, as provided in these By-Laws.

ARTICLE IX. Resignation of membership shall be made in writing to the Permanent Secretary or Treasurer, but no resignation shall be accepted from any one who is in arrears to the Treasury.

All resignations shall be acknowledged in writing by the officer who receives them, and shall be reported to the Council.

ARTICLE X. Any member may be expelled for improper conduct, or the violation of the Constitution, By-Laws, or Ethics adopted by the Association, but no person shall be expelled unless he shall receive for expulsion two-thirds of all the votes cast at some regular session.

ARTICLE XI. Pharmacutists, chemists, and other scientific men, who may be thought worthy the distinction, may be elected honorary members. They shall not, however, be required to contribute to the funds, nor shall they be eligible to hold office, or vote at the meetings.

CHAPTER IX.

Of Meetings.

ARTICLE I. The meetings shall be held annually : Provided, that in case of failure of this, from any cause, the duty of calling the Association together shall devolve upon the President or one of the Vice Presidents, with the advice and consent of the Council.

ARTICLE II. The order of business at the first session of each Annual Meeting shall be as follows :

Section 1. Promptly at the time named in the notice issued for the meeting, the President, or, in his absence, one of the Vice-Presidents, or, in their absence, a President *pro tempore*, shall officiate.

Section 2. In the absence of the Permanent Secretary, the President shall appoint a Recording Secretary *pro tempore*, who shall perform the duties of the Permanent Secretary until his arrival.

Section 3. Nineteen members shall constitute a quorum for the transaction of business.

Section 4. The President's address may then be read, after which the Council shall report the list of properly accredited delegates. The Secretary shall then call the roll, noting the names of the delegates and members in attendance.

Section 5. The Council shall read the names of the candidates for membership, as provided in Section 2, Article VIII., Chapter VI.

Section 6. Reports of committees shall be presented, read by their titles, the synopsis, or in full, and laid on the table for future consideration.

Section 7. The President shall call the roll of Colleges and Associations represented, requesting each delegation in turn to appoint one member, the person so selected to act as a committee to nominate officers for the Association, the Standing Committees, and members of the Council for the ensuing year; in addition to which he shall appoint five members who are not delegates, to act with the committee.

Section 8. The minutes of the Council shall be read in full at the Annual Meeting of the Association, and its acts, if approved, shall be sustained by a vote of the majority of the members present; or, if disapproved by a majority of the members present, their acts shall be revised, so as to be acceptable to the Association.

Section 9. A committee of five shall be appointed to examine and report upon specimens exhibited.

Section 10. Incidental business may be called up.

ARTICLE III. The order of business at the second session at each Annual Meeting shall be as follows:

Section 1. The President shall call the Association to order.

Section 2. The Secretary shall read the minutes of the preceding meeting, which may be amended if necessary, and shall then be approved.

Section 3. The report of the Committee on Nominations shall be read; when the President shall appoint tellers, and the Officers and Committees nominated shall be balloted for.

Section 4. The officers shall take their respective places.

Section 5. The Council shall present names recommended for membership.

Section 6. Reports of Standing Committees shall be read.

Section 7. Reports of Special Committees shall be read.

Section 8. The second session shall close with the examination of specimens on exhibition.

ARTICLE IV. The order of business at subsequent sessions shall be determined by the Council, with the consent of the Association.

ARTICLE V. *Section 1.* The Association invites manufacturers and others to exhibit at the Annual Meeting crude drugs, chemicals, pharmaceutical preparations, chemical and pharmaceutical apparatus and utensils, and such objects as possess a general scientific or special pharmaceutical interest.

Section 2. The following articles shall not be admitted to these exhibitions: Proprietary and patented medicines, medicinal or pharmaceutical preparations, the names of which have been copyrighted or the complete working formula of which is withheld, and such chemical preparations or mixtures which are offered under other than their proper scientifically recognized names.

Section 3. The Committee on Exhibition, appointed under Chapter VIII., Article II., Section 9, shall report during the meeting on the articles exhibited, with such comments as in their judgment may be deemed proper.

CHAPTER X.

Of Rules of Order and Debate.

ARTICLE I. The ordinary rules of parliamentary bodies shall be enforced by the presiding officer, from whose decision, however, appeals may be taken, if required by two members, and the meeting shall thereupon decide without debate.

ARTICLE II. When a question is regularly before the meeting, and under discussion, no motion shall be received but to adjourn, to lay on the table, for the previous question, to postpone to a certain day, to commit or amend, to postpone indefinitely; which several motions have precedence in the order in which they are arranged. A motion to adjourn shall be decided without debate.

ARTICLE III. No member may speak twice on the same subject, except by permission, until every member wishing to speak has spoken.

ARTICLE IV. On the call of any two members, the yeas and nays shall be ordered, when every member shall vote, unless excused by a majority of those present, and the names and manner of voting shall be entered on the minutes.

CHAPTER IX.

Miscellaneous.

ARTICLE I. In all such points of order as are not noticed in these By-laws, the Association shall be governed by the established usages in all assemblies governed by parliamentary rules.

ARTICLE II. Every proposition to alter or amend these By-laws shall be submitted in writing, and may be balloted for at any subsequent session, when, upon receiving the votes of three-fourths of the members present, it shall become a part of the By-laws.

ARTICLE III. No one or more of these By-laws shall be suspended.

BY-LAWS OF THE COUNCIL.

CHAPTER I.

ARTICLE I. The officers of the Council shall consist of a Chairman, Vice-Chairman, and Secretary, who shall be elected by ballot by the Council, to serve one year.

ARTICLE II. They shall be elected and shall assume the duties of their respective offices immediately after the election of the new members of the Council by the Association.

CHAPTER II.

Of the Chairman and Vice-Chairman.

ARTICLE I. The Chairman shall preside at all meetings of the Council; in his absence, or on account of inability from any cause, the Vice-Chairman; or, in the absence of both, a Chairman *pro tempore* shall perform the duties of Chairman.

ARTICLE II. The Chairman of the Council shall confer with the chairmen of the various special and standing committees of the Association, during its sessions, in order to arrange and expedite the business of the Association.

CHAPTER III.

Of the Secretary.

ARTICLE I. The Secretary shall keep fair and correct minutes of the proceedings of the meetings, and carefully preserve all reports and papers of every description received by the Council.

ARTICLE II. He shall post in a conspicuous place in the meeting-rooms the names of the applicants for membership.

ARTICLE III. He shall read all the papers handed him by the Chairman for that purpose, shall call and record the yeas and nays whenever they are required to be called; he shall notify the chairman of every special committee of his appointment, giving him a list of his colleagues and stating the business upon which the committee is to act, and shall notify every member of the time and place of each meeting.

CHAPTER IV.

Committee on Membership.

ARTICLE I. The Committee on Membership shall consist of five members of the Council, to be elected annually by ballot. The Permanent Secretary and the Treasurer of the

Association shall be *ex-officio* members of this committee. The committee shall elect their chairman immediately after their election by the Council.

ARTICLE II. The Committee on Membership shall be charged with the duty of keeping a correct list of the members of the Association, and shall present the list of applicants for membership, who have complied with the requirements of the By-Laws of the Association, to the Council.

ARTICLE III. They shall furnish appropriate obituary notices of deceased members for publication in the Proceedings.

CHAPTER V.

On Committee on Publication.

ARTICLE I. The Committee on Publication shall consist of five members, to be elected by ballot by the Council, who shall elect their chairman immediately after their own election by the Council.

ARTICLE II. The Committee on Publication shall have charge of the publication and distribution of the Proceedings, and may select annually the portrait of a deceased member to be issued with the Proceedings.

CHAPTER VI.

On Committee on Finance.

ARTICLE I. The Committee on Finance shall consist of three members. They shall audit all bills of the Association, and orders on the Treasurer for the payment of bills shall not be issued without the consent of the Finance Committee.

CHAPTER VII.

Of the Centennial Fund.

ARTICLE I. A Committee on the Centennial Fund shall be formed, consisting of the President or one of the Vice-Presidents of the Association, of the Chairman of the Committee on Finance, and of the Permanent Secretary. They shall annually, at the meetings, and after due notice through the Pharmaceutical Journals, receive applications in writing from members for grants from the interest derived from the Centennial Fund, the applications to be accompanied by a statement of the investigation to be made, and of the amount of material required—it being understood that the results of the investigation, together with a full report thereon, be laid before the annual meeting of the Association.

ARTICLE II. After considering these applications, the Committee shall, at as early a date as possible, report to the Council, recommending such grants from the available funds as they may deem proper.

ARTICLE III. The Council shall decide upon these recommendations, and shall direct orders to be drawn upon the Treasurer in favor of those members to whom grants have been made.

CHAPTER VIII.

On Meetings.

ARTICLE I. The Council shall meet on the day immediately preceding that fixed for the assembling of the Association, and at such other times as they may adjourn to, or at the call of the Chairman.

ARTICLE II. On the written application of three members to the Chairman of the Council, a special meeting shall be called.

ARTICLE III. Five members of the Council shall constitute a quorum.

CHAPTER IX.

Miscellaneous.

ARTICLE I. Three members of any of the standing committees shall constitute a quorum for the transaction of business.

ARTICLE II. In all questions arising before the Council or its committees, and which can be disposed of by a positive or a negative vote, the Chairman of the Council, or the chairman of the committee, may take the vote of their respective bodies in writing, and the same shall have the same force and effect as if the members had been personally present.

ARTICLE III. Every proposition to alter or amend these By-laws shall be submitted in writing, and may be balloted for at the next session of the Council, when, upon receiving the votes of three-fourths of the members present, it shall become a part of these By-laws.

FORM OF APPLICATION FOR MEMBERSHIP.

APPROVING of the objects of the American Pharmaceutical Association, I am desirous of joining it in membership; and having read its Constitution and By-laws, I hereby signify my approval of the same, and subscribe to them.

Name in full,

Address,

.....

TESTIMONIALS.

The undersigned, members in good standing, being personally acquainted with
of
testify to his moral character, his skill as a practical druggist and pharmacist, and his professional probity and good standing, and they recommend him for membership in the American Pharmaceutical Association.

NAMES.

ADDRESS.

ROLL OF MEMBERS.

HONORARY MEMBERS.

FOREIGN COUNTRIES.

AUSTRIA.

Anton von Waldheim, *Vienna*, 1871.

BELGIUM.

A. T. DeMeyer, *Brussels*, 1868.

Norbert Gille, *Brussels*, 1868.

ENGLAND.

Dr. John Attfield, *London*, 1871.

Thomas Greenish, *London*, 1882.

Dr. Robert Bentley, *London*, 1872.

Joseph Ince, *London*, 1882.

Henry B. Brady, *Newcastle-on-Tyne*, 1871.

Richard Reynolds, *Leeds*, 1882.

Dr. J. Redwood, *London*, 1871.

George W. Sanford, *London*, 1882.

Michael Carteighe, *London*, 1882.

Geo. F. Schacht, *Clifton, Bristol*, 1882.

FRANCE.

Dr. Augustin A. Délonde, *Sèvres*, 1871.

Dr. G. Planchon, *Paris*, 1877.

Stanilas Martin, *Paris*, 1872.

Dr. J. Léon Soubeiran, *Montpellier*, 1871.

GERMANY.

Dr. Christian Brunnengraeber, *Rostock*, 1882.

Dr. Hermann Hager, *Pulvermühle bei Fürstenberg*, 1868.

Dr. Adolph Duflos, *Annaberg*, 1871.

Dr. Carl Schacht, *Berlin*, 1882.

Dr. F. A. Flückiger, *Strassburg*, 1868.

Dr. G. C. Wittstein, *Munich*, 1868.

GREECE.

Dr. Xaver Landerer, *Athens*, 1877.

ITALY.

Cav. Niccola Sinimberghi, *Rome*, 1882.

NETHERLANDS.

Dr. J. E. De Vrij, *Hague*, 1871.

RUSSIA.

Dr. G. Dragendorff, *Dorpat*, 1868.

J. von Martenson, *St. Petersburg*, 1882.

SWITZERLAND.

Dr. Edward Schaer, *Zurich*, 1877.

ACTIVE MEMBERS.

Members are requested to report any inaccuracies in these lists, and to notify the Secretary and Treasurer of all changes of address.

(The names of life members in SMALL CAPITALS. Names of life members under the old Constitution in *italics*.)

UNITED STATES OF AMERICA.

ALABAMA.

Mobile.

Candidus, Philip Charles	1857
Hawkins, Joseph Thomas	1878
Mohr, Charles	1871
Moore, Thomas F.	1878
Punch, William Francis	1874
Savage, Thomas Jameson	1881
Van Antwerp, Garet.	1880

Selma.

Galt, Edward Pegram	
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ARKANSAS.

Hot Springs.

Cabell, George William	1880
Menard, Robert Patterson	1883
Newman, Alcuin Eason	1880
Pollard, Frank Wilder.	1880

Little Rock.

Bond, John Barnitz	1883
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Searcy.

Zimmerman, John L.	1883
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CALIFORNIA.

San Francisco.

Brackett, Aurick Smith	1868
Calvert, John.	1870
Dawson, John H.	1882
Joy, Edwin Wolcott.	1882
Lengfeld, Abraham Louis	1879
Mack, Adolph	1880
<i>Moffit, Thomas S.</i>	1861
Runyan, Edward Wheelock	1875
Searby, William Martin	1882
Simpson, William.	1870
<i>Steele, Henry.</i>	1859
Steele, James Gurden	1859
Wenzell, William Theodore	1870

Alameda, Alameda Co.

Elbe, Constantine Berthold.	1877
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Eureka, Humboldt Bay.

Powell, Robert Baldwin	1880
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Los Angeles.

Preuss, Edward Anthony.	1882
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Red Bluff.

Darrough, Charles Henry.	1884
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Santa Clara.

Oberdeener, Moses	1880
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Vallejo, Solano Co.

Frost, James	1870
Topley, James.	1869

COLORADO.

Central City.

Best, John	1866
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Denver.

Frazee, George Blair.	1880
Hartung, Hugo Rudolph.	1876
Scholtz, Edmund Louis.	1881
Steinhauer, Frederick	1881
Walbrach, Arthur.	1881

COLUMBIA, DISTRICT OF.

Washington.

Becker, Charles.	1875
Boyd, George Washington	1883
Bury, Edward Berkley.	1870
Christiani, Charles.	1874
Coumbe, Oscar Henry	1883
Cromwell, Zachariah William.	1870
Drew, John Waters	1876
Duckett, Walter G	1876
Dufour, Clarence Reuter.	1876
Fickling, Charles Hollingshead	1883

Johnston, Henry Augustus 1883
 Knabe, Gustavus Alexander 1876
 Lewis, Samuel Edwin 1875
 Lockhart, George Bradfield 1883
 Major, John Richards 1873
 Martin, John Charles 1883
 Milburn, John Alexander 1858
 Milburn, Washington Coad 1883
 Murray, Talbot Chambers 1883
 Nattans, Arthur 1883
 Pettingill, Edward True 1880
Reinlein, Paul 1856
 Scala, William Franklin 1876
 Schafhirt, Adolph Julian 1876
 Short, Joshua Eagan 1883
 Simms, Giles Green Craycroft 1860
 Thompson, William Scott 1871
Tyson, Samuel Ellicott 1857
 Walton, Joseph Richardson 1883
 Wehrly, Thomas McAleer 1883

CONNECTICUT.

Ansonia.

Bristol, Charles Edward 1880

Hartford.

Chapin, Frederick Hastings 1880
 Goodrich, Stephen 1875
 Goodwin, Lester Henry 1875
 Rapelye, Charles Andrew 1876
 Williams, John Kirby 1875

Killingsworth.

Nichols, Edward Payson 1870

Litchfield.

Gates, Howard Eugene 1873

Middletown.

Pitt, John Richard, Jr. 1872

New Britain.

Thomson, Edward Willett 1880

New Haven.

Benedict, Willis 1882
 Francis, Walter R. 1882
 Gessner, Emil Adolph 1878
 Spalding, Warren Alphonso 1876
 Sperry, Herman Jay 1880
 Wells, Romanta 1877
 Wood, Alonzo Felton 1876

Norwich.

Osgood, Hugh Henry 1875
 Sevin, Nathan Douglas 1875

Stamford.

Haight, William Bogardus 1872

Waterbury.

Dikeman, Nathan 1859
 Munson, Luzerne Ithiel 1872
 Wilcox, Frederick 1878
 Woodruff, Roderick Samuel 1876

West Winsted.

Phelps, Dwight 1873

Westville.

Melvin, J. Lacy 1882

Willimantic.

Wilson, Frank Milton 1883

Winsted.

Renouff, James Theron 1877

DAKOTA.

Bismarck.

Pettit, Louis Clark 1881

Mitchell.

Warne, Henry Lee 1881

DELAWARE.

Wilmington.

Belt, Zedekiah James 1876
 Smith, Linton 1870

FLORIDA.

Cedar Key.

Wooldridge, Napoleon 1883

Fort George.

Rollins, John Francis 1859

Opopka, Orange Co.

Kent, Robert Restieux 1855

Waldo.

Wheeler, Lucien Fitch 1858

GEORGIA.

Albany.

Welch, Leonard Edward 1878

Atlanta.

Behre, Charles Henry Ernst	1882
Bradfield, Louis Henry	1878
Jacobs, Joseph	1882
Rankin, Jesse Willis	1877
Schumann, Peter John	1878
Schumann, Theodore	1860

Augusta.

Durban, S. C.	1883
Land, Robert Henry	1859

Cuthbert.

Stanford, James William	1878
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Macon.

Brunner, Norman Isaac	1878
Hunt, Leonard Washington	1878
Ingalls, John	1876
McConville, Thomas Aloysius	1864

Rome.

Fenner, William Roane	1871
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ILLINOIS.

Bradford, Stark Co.

Plummer, David Graham	1869
Plummer, William Pitt	1881

Camp Point.

Bartells, George Case	1881
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Canton.

Ruble, John B.	1884
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Champaign.

Cunningham, A. P.	1884
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Chicago.

Ade, Samuel Gottlob	1883
Bartlett, Nicholas Gray	1864
BIROTH, HENRY	1865
Blahnik, Lorenz	1881
Blocki, William Frederick	1863
Borland, Matthew Wilson	1876
Buck, George	1860
Button, Charles Edwin	1881
Clapp, Chambers Brown	1883
Coffin, Samuel Lockwood	1879
Cowdrey, Robert Hall	1879
Dale, William Macmillan	1880
EBERT, ALBERT ATHELBERT	1864
Fuller, Henry Weld	1865
Fuller, Oliver Franklin	1869

Gale, Edwin Oscar	1857
Gale, William Henry	1857
Garrison, Herod Daily	1869
Grassly, Charles William	1884
Guy, George Omar	1884
Hallberg, Carl Swante Nicanor	1879
Hamilton, Emil	1881
Hartwig, Charles F.	1881
Heller, Ludwig	1884
Henes, William Frederick	1876
Heuermann, Henry William	1869
Hogey, Julius Henry	1880
Jacobus, Judson Schradlow	1870
Kadlec, Lawrence Wesley	1880
Lord, Thomas	1882
Martin, Hugo W. C.	1881
Maynard, Henry Sherman	1880
McPherson, George	1865
Moore, James Penn	1872
Oldberg, Oscar	1873
Parsons, John	1865
Patterson, Theodore H.	1869
Plautz, C. Herman	1881
Reinhold, William	1866
Sargent, Ezekiel Herbert	1864
Scherer, Andrew	1884
Somers, Frank Giddings	1877
Wheeler, Charles Gilbert	1876
WHITFIELD, THOMAS	1865
Wilson, Julius Henry	1869
Woltersdorf, Louis	1865
Zahn, Emil Augustus	1881

Danville.

Winslow, Edwin Cook	1879
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Galesburg.

Clark, Albert Burr, Jr.	1868
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Highland.

Knoebel, Edmund	1882
Mueller, Adolphus	1871

Joliet.

Brewer, Percival	1881
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Peoria.

Allaire, Charles Bowen	1880
Stuart, Ennere Boyce	1880
Zimmermann, Charles	1881

Peru, La Salle Co.

Hattenhauer, Robert Christopher	1881
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Quincy.

Schroeder, Hermann 1871

INDIANA.

Anderson.

Buck, Albert Byron 1879

Aurora.

Riddell, James A. 1879

Cambridge City.

McCaffrey, James 1883

Evansville.

Schmidt, Florian Charles 1882

Schlaepfer, Henry John 1879

Fairmount.

Edwards, Nathan Wilson 1879

Indianapolis.

Dill, John B. 1878

Driggs, Nathaniel S. 1881

Earnshaw, William Jonathan 1881

Frauer, Herman E. 1881

Haag, Julius A. 1879

Hurty, John N. 1882

Lambert, John Albert 1879

Lilly, Eli 1878

Lynn, Winfield Scott 1882

Martin, Emil 1878

Metzner, Adolph 1879

Miller, Charles Edward 1880

Mueller, Louis Henry 1879

Schrader, Henry 1869

Sloan, George White 1857

Staley, Michael C. 1881

Jasper, Dubois Co.

Mehringer, Joseph A. 1882

Jeffersonville.

Loomis, John Clarence 1876

Lafayette.

Hilt, David 1879

Reule, John 1882

Yeakel, Nathan Webb 1879

Kendallville.

Lohman, George H. 1872

Madison.

Harper, Frank Merritt 1874

New Albany.

Knoefel, August 1879

Rensselaer.

Kanal, Emmet 1882

Seymour.

Andrews, Josiah Harding 1879

South Bend.

Eliel, Leo 1882

Tell City.

Schreiber, August 1876

Terre Haute.

Baur, Jacob 1879

Buntin, William Campbell 1874

Cox, David P. 1884

Vincennes.

Watjen, Herman J. 1882

IOWA.

Boone.

Townsend, Abraham R. 1880

Burlington.

Wigert, Carl Reinhold 1876

Cedar Falls, Black Hawk Co.

Bryant, William Cullen 1881

Cedar Rapids, Linn Co.

Truax, Charles 1882

Clinton.

Major, Oscar 1880

Davenport.

Ballard, John Winthrop 1871

Harrison, Jacob Hugh 1883

Thackeray, William Thomas 1884

Decorah.

Weiser, Emilius Ilgenfritz 1880

Des Moines.

Weaver, Charles Augustus 1880

Dubuque.

Ferdinand, George Adam 1879

Ruete, Theodore William 1870

Fort Dodge.

Oleson, Olaf Martin 1877

<i>Fort Madison.</i>	
Schafer, George Henry	1871
<i>Indianola.</i>	
Buffington, Cyrus Adams	1880
<i>Marshalltown.</i>	
Birchard, Abner Theodore	1881
<i>Monticello.</i>	
Tiarks, Hermann	1876
<i>Muscatine.</i>	
Krepe, J. Theodor	1884
<i>Sioux City.</i>	
Moore, Silas Harwood	1880
More, Arthur James	1881
Schirling, Gustav	1884
<i>Waterloo.</i>	
Wangler, Conrad David	1876
KANSAS.	
<i>Abilene.</i>	
DeHuy, Bernard Henry	1883
<i>Belle Plaine.</i>	
Butler, George Frank	1883
<i>Coffeyville.</i>	
Slosson, George	1882
<i>Florence.</i>	
Stanford, William A.	1881
<i>Girard.</i>	
Walker, George	1881
<i>Lawrence.</i>	
Leis, George	1869
<i>Leavenworth.</i>	
Brown, Robert J.	1862
<i>Nickerson, Reno Co.</i>	
Sturtevant, T. Frank	1880
<i>Peabody.</i>	
Robert, Daniel John	1881
<i>Salina.</i>	
Seitz, Oscar	1881
<i>Stirling, Rice Co.</i>	
Plummer, Edwin Morton	1881

KENTUCKY.	
<i>Bowling Green.</i>	
Burge, James Oscar	1878
<i>Corrington.</i>	
Geier, Oscar William	1880
<i>Covington.</i>	
Zwick, George Gilbert	1874
<i>Eminence.</i>	
Porter, Chelton Scott	1882
<i>Flemingsburg.</i>	
Reynolds, John J.	1876
<i>Frankfort.</i>	
Averill, William Henry	1874
<i>Lewisport.</i>	
Martin, Charles C.	1881
<i>Louisville.</i>	
Beckman, Oscar Albert	1879
Colgan, John	1867
Davis, Vincent	1874
Diehl, Conrad Lewis	1863
Fischer, Phil.	1883
Goebel, Edward	1884
Huddard, John Fletcher	1870
Jones, Simon Newton	1870
Kessler, Edward Fredrick	1879
Miller, Frederick Christopher	1874
Newman, George Abner	1866
Pfingst, Edward Charles	1874
PFINGST, FERDINAND JOHN	1867
Pfingst, Henry Adolph	1874
Rademaker, Hermann Henry	1879
Renz, Frederick J.	1883
Rogers, Wiley	1874
Scheffer, Emil	1872
Schiemann, Edward Bernard	1880
Schoettlin, Albert John	1882
Springer, William Theodore	1882
Strassel, William	1870
Sutton, Peter Priest	1871
Wilder, Graham	1868
<i>Newport.</i>	
Feth, Joseph George	1880
<i>Nicholasville.</i>	
Oxley, Jefferson	1878

Shelbyville.

McKenney, Jesse Fisher 1878

Uniontown.

Hardigg, William Leopold 1881

LOUISIANA.

New Orleans.

Finlay, Alexander Kirkwood 1883

Keppler, Christian Lewis 1882

Lavigne, Jean Baptiste 1883

Lewis, Ben 1883

Lyons, Isaac Luria 1875

Mellon, John J. 1883

Baton Rouge.

Brooks, Francis Marion 1879

Bayou Goula.

Viallon, Paul Louis 1870

Franklin.

Frere, Alexander G. 1882

Houma.

Gonaux, François 1883

New Iberia.

Lee, James Augustin 1856

Plaquemine.

Dellavallade, Jean Michel 1873

Thibodeaux.

Roth, Eugene Norbert 1880

Thibodeaux, Joseph Theogine 1870

MAINE.

Augusta.

Partridge, Charles Kimball 1867

Bangor.

Harlow, Noah Sparhawk 1859

Sweet, Abel Sylvester, Jr. 1883

Sweet, Caldwell 1881

Bath.

Anderson, Samuel 1876

Belfast.

Moody, Richard Henry 1876

Biddeford.

Boynton, Herschell 1875

Blue Hill.

Morrill, Benjamin 1876

Eastport.

Shead, Edward Edes 1866

Ellsworth.

Parcher, George Asa 1875

Pittsfield.

Libby, Henry Fitzgerald 1882

Portland.

Cummings, Henry Thornton 1853

Dana, Edmund, Jr. 1877

Frye, George Carlton 1879

Hay, Henry Homer 1867

Jordan, William Henry 1871

Perkins, Benjamin Abbott 1878

Phillips, Walter Fiske 1859

Winterport.

Morrell, Mary Helen 1883

MARYLAND.

Baltimore.

Baxley, Jackson Brown 1856

Brack, Charles 1876

Burrough, Horace 1883

Caspari, Charles, Jr. 1883

Culbreth, David Marvel Reynolds 1883

Dohme, Charles Emile 1863

Dohme, Lewis 1859

Eareckson, Edwin 1875

Edwards, William Fletcher 1883

Elliott, Henry Alexander 1859

Emerson, Isaac Edward 1883

Emich, Columbus Valentine 1863

Frames, James Parker 1868

Gosman, Adam John 1870

Hancock, John Francis 1863

Hassencamp, Ferdinand 1872

Jefferson, John Henry Bailey 1868

Jennings, Nathaniel Hynson 1857

Lauer, Michael John 1865

Lautenbach, Robert 1870

Monsarrat, Oscar 1856

Moore, Jacob Faris 1856

Muth, John Philip 1864

Perkins, Elisha Henry 1857

Risk, Clarence H. 1882

Roberts, Joseph 1856

Russell, Eugene Janus 1856

Russell, Edward Walton 1856

Sappington, Richard 1870

Sharp, Alpheus Phineas 1855

Thompson, William Silver	1856	Jones, James Taber	1875
Thompson, William Partlow	1874	Kelly, Edward Samuel	1871
Thomsen, John Jacob	1856	<i>Lincoln, Henry Ware</i>	1853
Thomsen, John Jacob, Jr.	1883	Lowd, John Colby	1871
Thornton, William Edward	1883	Luce, Edgar Henry	1879
Tilyard, Charles Slade	1867	Markoe, George Fred. Holmes . . .	1863
Webb, John Alansen	1870	<i>Melvin, James Samuel</i>	1853
Winkleman, John Henry	1864	<i>Metcalf, Theodore</i>	1857
Woodward, Samuel Morris	1874	Mowry, Albert D	1884
<i>Chestertown.</i>		O'Brien, James John	1875
Stam, Colin Augustus	1882	Patch, Edgar Leonard	1872
Toulson, Melbourn Ashbury	1883	<i>Fatten, Ichabod Bartlett</i>	1858
<i>Cumberland.</i>		Pierce, William Herbert	1879
Campbell, William Pendleton	1879	Prescott, Horace Augustus	1875
Herman, John George	1878	Restieaux, Thomas	1853
Shriver, Henry	1876	Sewall, David Jewett	1875
Shryer, Thomas Wilson	1875	Sharples, Stephen Paschell	1875
<i>Frederick City.</i>		Shedd, Edwin Walter	1879
Schley, Steiner	1878	SHEPPARD, SAMUEL AIRUS DARLING-	
<i>Hagerstown.</i>		TON	1865
Winter, Jonas	1863	Siegemund, Charles Augustus	1882
MASSACHUSETTS.		Smalley, Elijah	1860
<i>Boston.</i>		Snow, Jesse Walker	1875
Babo, Leopold	1859	Stowell, Daniel	1875
Bartlet, William Williams	1875	Tower, Levi Jr	1860
Bassett, Charles Harrison	1867	<i>Turner, Thomas Larkin</i>	1853
Bolles, William Palmer	1875	Underwood, Charles Gordsford . . .	1865
Boyden, Edward Cleveland	1874	Webster, Stephen	1875
Browne, Clarence Edward	1880	Wilson, Benjamin Osgood	1859
Burley, Edward Porter	1877	Winslow, Samuel Wallis	1875
<i>Burnett, Joseph</i>	1852	<i>Woodbridge, George Washington</i> . .	1859
Campbell, Isaac Towle	1859	<i>Andover.</i>	
Canning, Henry	1865	Parker, George Hawkins	1874
Carter, Solomon	1865	<i>Cambridge.</i>	
Chapin, William Amos	1880	Hubbard, John Henry	1866
<i>Colcord, Samuel Marshall</i>	1852	Wood, Edward Stickney	1879
Colton, James Byers	1865	<i>Cambridgeport.</i>	
Cramer, Max	1881	Bayley, Augustus Ramsey	1859
CUTLER, EDWARD WALDO	1859	Orne, Joel Stone	1859
Davenport, Bennett Franklin	1879	Orne, Charles Parker	1874
<i>Doliber, Thomas</i>	1859	<i>Charlestown.</i>	
Drury, Linas Dana	1871	Marshall, Ernest Clifton	1875
Follansbee, Sherman	1875	Stacey, Benjamin Franklin	1860
French, George Washington	1865	<i>Chelsea.</i>	
Godding, John Granville	1875	Buck, John	1855
Goodale, Thomas Trefethen	1879	Buck, John Lynain	1883
Hoyt, George Melvin	1875	<i>East Pepperell.</i>	
Jenkins, Luther Lincoln	1867	Dunham, Charles Sumner	1875

Fitchburg.

Choate, John 1877

Great Barrington.

Eddie, Charles Hurlbert 1882

Lillie, Charles Herbert 1875

Whiting, Frederick Theodore 1863

Haverhill.

Emerson, Charles B 1883

Frothingham, Edward Gilman 1875

Holyoke.

Ball, Charles Ely 1885

Morgan, Richard Evan 1875

Lawrence.

Whitney, Henry Martin 1859

Lee.

Pease, Francis Merrick 1880

Lowell.

Bailey, Frederick 1869

Butler, Freeman Hall 1874

Hood, Charles Ira 1871

Kidder, Samuel 1859

Lynn.

Colcord, Joseph Webster 1882

Marlborough.

Hartshorn, Frederick Arthur 1880

Middleboro.

Drake, Charles William 1873

Natick.

Daniels, Samuel Olney 1875

New Bedford.

Blake, James Edwin 1866

Hadley, Frank Rufus 1872

Lawton, Charles Henry 1873

Lawton, Horace Allen 1873

Shurtleff, Israel Hammond 1875

Taylor, John Pitman 1875

Newburyport.

Goodwin, William W 1853

Newton.

Hudson, Arthur 1882

Newton Centre.

Noble, John Joseph 1875

North Andover.

Berrian, George Washington 1857

Peabody.

Grosvenor, David P., Jr. 1881

Pittsfield.

Atwood, Luther Lee 1876

Quincy.

Whall, Joseph Stokes 1873

Rockland.

Easton, Luther Waite 1875

Estes, Joseph Joslyn 1870

Rockport.

Blatchford, Eben 1857

Salem.

Luscomb, William E 1881

Nichols, Thomas Boyden 1876

Price, Charles H. 1882

Saugus.

Hill, James Ward Harris 1880

Shelbourne Falls.

Baker, Edwin 1875

Somerville.

Cowdin, George Henry 1875

Flanagan, Lewis Cass 1875

Springfield.

Alden, Charles Packard 1874

Webber, Joseph Terrence 1873

Stockbridge.

Clark, William Bills 1880

Taunton.

Drown, Lowell Appleton 1883

Walpole.

Pilsbury, Frank Otis 1881

Waltham.

Johnson, Horace Irving 1880

Warren.

Harwood, Frank Lucian 1875

West Acton.

Hutchins, Isaiah 1880

West Stockbridge.

Moore, James S 1882

Worcester.

Bush, William	1875
Dinsmore, George Frederick	1879
Scott, George Theodore	1883
<i>Scott, Nelson Ryan</i>	<i>1859</i>
Williams, Duane Burnett	1881

MICHIGAN.

Adrian.

Ross, Ellison Halsey	1880
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Ann Arbor.

Brown, Henry J	1882
Eberbach, Ottmar	1869
<i>Garrigues, Samuel Smith</i>	<i>1855</i>
Green, Arthur L.	1884
Prescott, Albert Benjamin	1871
Wrampelmeier, Theodore J	1882

Battle Creek.

<i>Wardell, Robert C.</i>	<i>1860</i>
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Calumet, Houghton Co.

Macdonald, Daniel T.	1884
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Detroit.

Caldwell, James William	1875
Hawkins, Henry	1880
<i>Johnston, William</i>	<i>1860</i>
MacKimmie, George D.	1881
Ronnefeld, Theodore.	1866
Stone, Clarence George.	1884
<i>Vernor, James</i>	<i>1866</i>

East Saginaw.

Melchers, Henry	1869
Prall, Delbert Elwyn	1876

Ionia.

Gundrum, George	1882
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Jackson.

Latimer, Robert Fulton	1857
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Kalamazoo.

McDonald, George	1871
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Manistee.

Lyman, Asahel Hubert	1884
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Muskegon.

Jesson, Jacob	1872
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Saginaw City.

Keeler, William Henry	1872
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Ypsilanti.

<i>Morgan, James</i>	<i>1859</i>
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MINNESOTA.

Duluth.

Boyce, Samuel F.	1871
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Minneapolis.

Huhn, George.	1884
Nienstaedt, Hermann.	1879

Preston.

Weiser, Albert	1880
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St. Paul.

Noyes, Daniel R.	1882
Simmon, Karl.	1880
Stierle, Adolph	1882
<i>Sweeny, Robert Ormsby.</i>	<i>1866</i>

MISSISSIPPI.

Aberdeen, Monroe Co.

Eckford, Joseph William	1883
Tindall, Graham McFarland.	1880

Bay St. Louis.

Deléry, Edgar.	1878
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Fayette.

West, Howell Forman	1883
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Fort Gibson.

Shreve, John Alexander	1880
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Greenville.

Finlay, John Pelham	1883
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Holly Springs.

Athey, John Howard	1883
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Jackson.

Ash, Matthew Franklin	1856
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MISSOURI.

St. Louis.

Addington, William Bacon	1878
Ahlbrandt, Henry Ernst	1877
Alexander, Maurice William	1871
Blank, Alois	1871
Boehm, Solomon	1871
Catlin, Ephron	1871
<i>Chamberlain, Guilford Tracy</i>	<i>1853</i>
Curtman, Charles Otto.	1871
Featherston'h, Edward Richard.	1871
Good, James Michener.	1871
Grandjean, Charles	1871
Grandjean, Eugene	1871
Hassebrock, Henry Fred.	1884
Hemm, Francis.	1881
Jones, Charles Kendall	1867

Klie, George Henry Charles 1878
Leitch, Arthur 1860
Mallinckrodt, Edward 1869
Meyer, Christian Fred. Gottlieb. . . 1860
Pauley, Frank Charles. 1879
Physick, Henry Sandford. 1870
Richardson, James 1882
Richardson, Joseph Clifford 1871
Sander, Enno. 1858
Scheffer, Henry William. 1863
Sennewald, Ferdinand William . . . 1865
Tomfohrde, John William 1878
Ude. George 1871
Uhlich, Ferdinand G. 1881
Vardick, August Henry 1874
Wall, Otto A. 1884
Westmann, Frank Henry 1882
Williamson, Edward John 1876

Boonville.

Sombart, John E. 1881

Carrollton.

Pettit, Henry M. 1881

Columbia.

Hurt, James Francis. 1879

Glenwood.

Gray, Gilbert D. 1881

Hannibal.

Walker, Charles 1881

Joplin, Jasper Co.

Garrett, Oscar Newton 1881

Kansas City.

Arnold, Henry Clay. 1881

Ford, James M. 1881

Ford, William Thomas 1878

Gallagher, John A. 1881

Lahme, Charles Adolph 1881

Love, Charles Edward 1881

Young, Judson J. 1881

Macon.

Field, Amos 1871

Mexico, Adrian Co.

Llewellyn, John Frederick 1867

Mound City.

Browning, Woodville 1882

Rich Hill.

Youngs, William 1883

Weston.

Parr, John Conrad 1856

NEBRASKA

Omaha.

Goodman, Charles Frederick 1871

Kennard, Frank W. 1883

Kuhn, Norman Archibald 1878

NEVADA.

Virginia City.

Perkins, William Alexander 1869

NEW HAMPSHIRE.

Concord.

Eastman, Charles Smith 1874

Underhill, George Francis 1874

Dover.

Pinkham, Alonzo Taylor. 1874

Rackley, Benjamin Franklin. 1874

TUFTS, CHARLES AUGUSTUS 1856

Vickery, William Henry 1874

Exeter.

MERRILL, CHARLES AUGUSTUS 1858

Greenville.

Hall, Charles Edwin. 1884

Manchester.

Lull, George Edward 1881

Miville, Francis Charles 1877

Perry, Bayard Taylor 1876

Nashua.

Russell, Elias Smith. 1875

Whitman, Nelson Samuel 1875

New Market.

Dearborn, George Luther 1853

Twombly, John Herbert 1880

Newport.

Spofford, Charles Byron 1884

Portsmouth.

Preston, Andrew Peabody. 1881

Thacher, Joseph Haven 1859

Rochester.

Hanson, Dominicus 1878

Sanderson, Stephen Francis 1880

Somersworth.

Carleton, Robert Marsh. 1880
 Moore, George 1859

Suncook.

Hildreth, Charles Francis 1874

NEW JERSEY.

Bloomfield.

Scherff, John Philip 1877

Bordentown.

Carslake, George Middleton 1880

Burlington.

Vandegrift, John A 1867

Camden.

Brown, Albert Potts 1870
 Test, Alfred William 1870

East Orange.

Davis, George Randolph. 1883
 Rumsey, Samuel Louis 1876

Elizabeth.

Brant, Edmund Wade 1882
 Drake, Jonathan Baker 1875
 Kent, Henry Avery, Jr. 1880
 Loveland, William F. 1882
 Oliver, William Murray 1875

Elizabethport.

Frohwein, Richard. 1867

Englewood.

Rockefeller, Lucius 1880

Freehold.

Walker, Ansell 1880
 Walker, John Putnam 1881

Hackensack.

Adams, Hazen Wooster 1879

Hoboken.

KLUSSMANN, HERMANN 1876

Jersey City.

Abernethy, Maxwell 1865
 Dougherty, Samuel Edward. 1875
 Foulke, James. 1881
 Laird, William Rudolph 1867
 Turner, Isaac Worthington 1882

White, George Henderson 1868

Wienges, Conrad 1875

Matawan, Monmouth Co.

Slater, Frank H. 1882

Medford.

Thorn, Henry Prickett. 1879

Morristown.

Carrell, Eugene Ayers 1880

Dalrymple, Charles Hoagland 1876

Mt. Holly.

WHITE, AARON SMITH. 1860

Newark.

Betzler, Jacob 1880

Bruguier, Francis 1876

Dreher, Ernest 1869

Holzhauser, Charles 1873

Sayre, William Henry 1877

Smith, Charles Bradley 1868

Smith, Israel Preston 1876

Stamford, William Harrison 1876

Townley, William Mattison 1875

Vandervoord, Ransford Wells 1870

Van Winkle, Abraham. 1871

New Brunswick.

Rust, William 1870

Newton.

Ryerson, Henry Ogden 1882

Ocean Grove.

Vansant, Robert Hays 1879

Orange.

Musler, Abram 1883

Nicholas, William E. 1884

Parsons, Robert Edwin 1877

Orange Valley, Essex Co.

Yatman, John Lewis 1880

Plainfield.

Reynolds, Howard Prescott. 1875

Shaw, Robert Johnston 1875

Red Bank, Monmouth Co.

Lockwood, Samuel Alexander 1880

Roselle.

Tiernan, Frank Mortimer 1880

Salem.

Bassett, Joseph 1880

South Amboy.

JACQUES, GEORGE WASHINGTON . . 1869

Trenton.

De Cou, James Clarke 1880

Mangold, Gustavus Adolph. . . . 1875

Rickey, Randal 1870

NEW YORK.

New York City.

Atwood, Herman White 1873

Balluff, Paul 1860

Balser, Gustavus 1875

Bedford, Peter Wendover 1859

Bendiner, Samuel 1882

Billings, Henry Merry 1869

Bond, Joseph Romulus. . . . 1876

Buehler, Edward Handy 1874

Burdge, Jacob Uriah. . . . 1876

Campbell, Horace Willard 1875

Carle, John, Jr. 1860

Chandler, Charles Frederic 1867

Collins, Louis Dell 1880

Currie, John Harper 1858

Davis, Benjamin 1869

Dick, Dundas 1879

Ditman, Andrew J. . . . 1868

Dudley, Oscar Earle. . . . 1877

Eimer, Charles 1872

Fairchild, Benjamin Thomas 1875

Fisher, William. . . . 1862

Fougera, Edmund Charles 1867

Fraser, Edward Allen 1873

Frey, John 1865

Gardner, Charles H. . . . 1881

Gardner, Robert Winthrop 1867

Gridley, Junius. 1853

Griffith, William Henry. . . . 1874

Hancock, John Henry. . . . 1870

Haviland, Henry 1857

Hays, David 1867

Hegeman, Johnson Niven 1880

Higgins, James Starkey 1862

Hobart, Charles Henry 1880

Hoffmann, Frederick 1867

Hohenthal, Charles Frederick Lebe-

recht 1865

Hudnut, Alexander 1857

Ihlefeld, Conrad H. . . . 1881

Imgard, Julius 1882

Inness, George 1878

Johnson, Edward Lawless 1860

Jungmann, Julius 1879

Kalish, Julius 1875

Kimmel, Henry 1867

Knapp, Frank Fiero. . . . 1880

Krehbiel, Gustavus 1865

Laber, Julius 1881

Lazell, Lewis T. . . . 1858

Lehn, Louis 1874

Lins, Albert H. . . . 1881

MacLagan, Henry 1883

Macmahan, Thomas Jackson 1871

Main, Thomas Francis. . . . 1872

McIntyre, Byron Floyd 1876

McIntyre, Ewen 1873

McKesson, John, Jr. . . . 1867

Milhau, Edward Leon 1858

McLwitz, Ernest 1867

Morrison, Thomas Ormsby 1876

Neergaard, Sidney Herbert 1880

O'Neil, Henry Maurice. . . . 1879

Osann, Bernhard 1882

Osmun, Charles Alvin 1868

Otto, Charles Henry 1880

Painter, Emlen 1870

Parsons, Henry B. . . . 1882

Peixotto, Moses Levi Maduro 1869

Pfingsten, Gustavus 1873

Powell, William Reuben 1880

Reichard, Frederick Alfred 1871

Reiss, Edward Charles. . . . 1882

Rice, Charles. . . . 1870

Ricksecker, Theodore 1870

Robbins, Charles Albert 1876

Robbins, Daniel C. . . . 1862

Royce, Lucien Merriam 1866

Sands, George Gedney. . . . 1867

Scofield, James Stephen. . . . 1867

Seabury, George John 1876

Shearer, Edward Young 1880

Shedden, John William 1856

Sheils, George Emanuel 1860

Skelly, James Joseph 1866

Starr, Thomas 1870

Tscheppé, Adolph 1876

Tuska, David 1881

Van der Emde, Reinhold 1879

Wanier, George Simon. . . . 1876

Weinman, Oscar Christian 1873

White, Philip Augustus 1872

Wichelus, Frederick 1881

Wickham, William Hull 1870

Wilson, William 1876

Wohlfarth, Justin 1879
 Zellhoefer, George 1876

Brocklyn.

Aspinall, Walter Albert 1880
 Baker, Grenville Mellen 1880
Basset, Francis Morgan 1860
 Benjamin, James Henry 1878
 Brooks, George Washington 1879
 Close, George Cassidy 1858
 Curtiss, Charles Grenville 1866
 Cutts, Foxwell Curtis, Jr. 1875
 Davis, William Mortimer 1879
 Day, Carlos Erastus 1870
 Daycock, William Henry 1874
 De Forest, William Pendleton 1879
 Dennin, Charles 1875
 Douglas, Henry, Jr. 1875
 Dunn, John Augustus 1867
Du Puy, Eugene 1852
Hale, Frederick 1855
 Heydenreich, Emile 1867
 Jones, Thomas 1868
 Kitchen, Charles William 1865
 Krieger, Philip 1876
 Levy, Adolph 1877
 Livingston, Barent Van Buren 1872
 McElhenie, Thomas Diamond 1872
 Menninger, Henry Joseph 1866
Newman, George Anthony 1865
 Nicot, Louis Emile 1875
Niebrugge, John August 1861
Ollif, James Henry 1867
 Owens, Richard John 1860
 Parrish, Clemmons 1868
 Pyle, Cyrus 1859
 Ramsperger, Gustavus 1860
 Reusch, Ernst 1882
 Reynolds, Charles E. 1882
 Sayre, Edward Augustus 1877
Snyder, Ambrose Chancellor 1867
 Squibb, Edward Hamilton 1882
 Squibb, Edward R. 1858
 Stevens, Luther Fuller 1879
 Strachan, William Edward 1880
 Tartis, Alfred Joseph 1867
 Ubert, Julius 1876
 Underhill, Joseph Garness 1879
 Vincent, William 1870
 Wackerbarth, John 1883
 Wynn, William 1867

Albany.

Clement, Henry Bratt 1880
 French, William Barker 1880
 Gaus, Charles Henry 1879
 Gaus, Louis Henry 1880
 Gibson, Charles H. 1880
 Husted, Alfred Birch 1879
 McClure, Archibald 1880
 McClure, William Henry 1880
 Michaelis, Gustavus 1882
 Sauter, Louis 1879
 Turner, George Heather 1880
 Walker, William 1880
 Wheeler, Leonard Hiram 1883

Angola, Erie Co.

Oatman, Le Roy Sutherland 1872
 Penfold, Henry J 1882

Athens.

Post, Elisha 1876

Auburn.

Stanley, Edgar Clark 1880

AuSable Forks.

Smith, Jay Hungerford 1883

Bath, Steuben Co.

Knight, George Ely 1880

Bergen.

Fisher, Amos Sawyer 1880

Buffalo.

Darlington, James Augustus 1882
 Drefs, Charles A. 1882
 Harries, Oscar L. 1882
 Hayes, Horace Phillips 1880
Peabody, William Huntington 1857
Rano, Charles Orlando 1866
 Rieffenstahl, Julius 1879
 Tibbs, William Henry 1871

Castile, Wyoming Co.

Rolph, Charles W. 1882

Catskill.

DuBois, William Laneman 1880
 Dykeman, George Albert 1880
 Mott, George Frederick 1880

Cornwall, Orange Co.

Hazen, Peter Perry 1882

Croton Landing.

Henry, Charles (Dworniczak) 1881

<i>East Greenbush, Rensselaer Co.</i>		Rogers, William Henry.	1859
Munger, John F.	1881	<i>Mount Vernon.</i>	
<i>Elmira.</i>		Gill, George	1872
Holmes, Clayton Wood.	1876	<i>Newburgh.</i>	
<i>Fishkill on Hudson.</i>		Chapman, Isaac C.	1882
Moith, Augustus Theodore	1860	Gorham, John Ransom, Jr.	1879
<i>Flushing.</i>		<i>Niagara Falls.</i>	
Hepburn, John	1873	Griffith, Hiram Elijah	1875
James, William T.	1882	<i>Nyack, Rockland Co.</i>	
<i>Geneseo, Livingston Co.</i>		DeGraff, David	1879
Rogers, Arthur Henry	1882	<i>Pike, Wyoming Co.</i>	
<i>Gloversville, Fulton Co.</i>		Sweet, William S.	1882
Miller, Jason Albert	1879	<i>Port Jervis.</i>	
Van Auken, Jerrie A.	1880	Cook, George Edward.	1872
<i>Hannibal.</i>		<i>Potsdam.</i>	
Brewster, Wadsworth J.	1880	Thatcher, Harvey Dexter	1865
<i>Holly, Orleans Co.</i>		<i>Poughkeepsie.</i>	
Bishop, Francis M.	1882	Sherwood, Hezekiah Strong	1870
<i>Hume, Alleghany Co.</i>		<i>Richfield Springs.</i>	
Hopper, George S.	1881	Smith, Willard Alfred	1880
<i>Jamaica, L. I.</i>		<i>Rochester.</i>	
Baylis, Lewis Fosdick	1880	Aman, Henry.	1882
Goodale, Harvey Galusha.	1879	Davis, Edward Hatch	1880
Peck, George Lyman.	1883	Haass, G. Herman.	1872
<i>Johnstown.</i>		Paine, James Dixon.	1857
Cahill, John Francis	1880	Schmitt, Joseph M.	1882
<i>Kinderhook.</i>		Smith, Willard	1880
Van Alstyne, Franklin B.	1882	<i>Rome.</i>	
<i>Kingston.</i>		Bissell, John Gordon	1875
Dedrick, William Frederick.	1884	Broughton, Albert James.	1876
<i>Little Falls, Herkimer Co.</i>		Owens, James Alanson	1882
Hurley, John.	1882	<i>Sag Harbor.</i>	
<i>Lockport.</i>		Tooker, William Wallace	1879
Rommel, Emanuel	1882	<i>Sandbank.</i>	
Sweet, Frederick K.	1880	Rich, Willis S.	1882
<i>Luzerne, Warren Co.</i>		<i>Saratoga Springs.</i>	
Miller, George Yerrington	1872	Fish, Charles Frederick.	1866
<i>Malone.</i>		Mingay, James	1873
Miller, Robert McCleverty.	1880	Pennington, Thomas Henry Sands.	1877
<i>Middletown.</i>		<i>Schenectady.</i>	
KING, JAMES THEODORE.	1859	Davis, Edward L.	1881
		Hanson, Willis Tracy	1880

Silver Creek, Chautauqua Co.

Montgomery, Melvin 1882

Spencerport.

Milliner, William Seward. 1877

Stapleton, S. I.

Feeny, James 1882

Stillwater, Saratoga Co.

Schermmerhorn, Winfield Scott 1880

Syracuse.

Dawson, Edward Seymour, Jr. 1876

Snow, Charles Wesley 1876

Tompkinsville, L. I.

Bassett, John William 1875

Tonawanda, Erie Co.

Scoville, Charles Emery 1882

Utica.

Blaikie, William 1879

Wappinger's Falls.

Shrader, John L. 1880

Waterville, Oneida Co.

Bissell, Emery Gilbert 1879

Wellsville, Alleghany Co.

Hall, Edwin Bradford 1879

Yonkers.

Eschmann, Fred. William R. 1880

Finkel, Charles Edwin 1880

NORTH CAROLINA.

Ashville.

Lee, James Hardy. 1880

Chapel Hill.

Saunders, Richard Banbury 1858

Durham, Orange Co.

Vaughan, P. W. 1882

Fayetteville.

Hinsdale, Samuel Johnson 1875

Sedbury, Bond E. 1882

Goldsboro.

Hatch, Eugene Francis. 1883

Greensboro.

Porter, W. C. 1880

Raleigh.

Simpson, William 1873

Tarboro.

Cordon, John Gray Myers. 1882

Zoeller, Edward Victor 1878

Washington.

Gallagher, Charles Kewell 1857

Wilmington.

Harding, John Haywood 1881

Munds, James Cassidy 1878

OHIO.

Cincinnati.

Bain, Andrew Watson 1874

Beebe, John Walter 1880

Eger, George 1864

Elfers, Joseph C. 1864

Faust, Charles. 1879

Feemster, Joseph Hall 1873

Goodman, Emanuel 1879

Gordon, William John Maclester 1854

Greve, Theodore Lund August. 1864

Greyer, Julius 1880

Heineman, Otto 1864

Helman, Charles Martin 1864

Heun, Emil. 1881

Hildreth, Newton Gough 1879

JUDGE, JOHN FRENCH 1866

Karmann, William 1864

Klayer, Louis 1884

Koehnken, Herman Henry 1875

Kuerze, Robert Meinrad 1880

Lammert, C. Joseph 1881

Lloyd, John Uri 1870

Martin, William J. 1881

Meininger, Albert 1881

Merritt, Ashbel H. 1884

Merrell, George 1879

Phillips, Charles Wilson 1881

Rendigs, Charles Peter 1876

Reum, Herman Frank 1864

Ruppert, John. 1880

Sauer, Louis W. 1882

Schrack, Leo S. 1881

Schuerman, Frederick 1881

Serodino, Herman 1880

Thorp, Abner. 1879

Vilter, Herman 1881

Wagner, Henry 1876

Walton, Harry C 1881
 Wayne, Edward Simmons 1854
 Wells, Jacob David 1864
 Yorston, Matthew Mackay 1864

Akron.

Armstrong, Andrew Morehouse . . . 1876
 Smith, Joseph Stable 1878

Ashtabula.

Thurber, Almon Russell 1880

Belleville, Richland Co.

Warren, Mrs. Ella F 1882

Bluffton, Allen Co.

Hauenstein, William 1883
 Murray, Francis Marion 1876

Bryan.

Snyder, Alva Leach 1873

Chillicothe.

Baumgartner, Frederick 1880
 Howson, Walter Henry 1875
 Nipgen, John Alvin 1879

Circleville.

Evans, Samuel B. 1881

Cleveland.

Asplin, John Harding 1882
 Benedict, James I 1882
 Bruce, James 1882
 Cobb, Ralph Lathrop 1883
 Dreher, Louis 1881
 Gaylord, Henry Cleveland 1869
 Gegelein, Frederick L 1881
 Glines, George W. 1881
 Haber, Louis Anthony 1881
 Hartness, William Henry 1872
 Hechler, George Louis 1882
 Hopp, Lewis Christopher 1876
 Keiper Louis 1881
 Linden, Hugo F. 1882
 May, Arthur 1881
 Mayell, Alfred 1872
 Myers, Daniel 1882
 Parsons, Richard 1882
 Rosenwasser, Nathan 1880
 Schambs, George Mathias 1882
 Schellentraget, E. A 1882
 Scott, William Johnson 1872
 Slosson, Frank W 1882

Smithnight, Albert 1882
 Spencer, Peter Ignatius 1872
 Spieth, William F 1882
 Urban, Jacob P 1881
 Vaupel, Charles P 1872
 Weichsel, Franz 1881

Columbus.

Bruck, Philip H 1884
 Herbst, Frederick William 1882
 Hoffman, Otto L. 1883
 Huston, Charles 1872
 Karb, George James 1883
 Kaufman, George B. 1882
 Schueller, Ernst 1881
 Schueller, Frederick William 1880
 Sherwood, Louis Walker 1882

Dayton.

Weusthoff, Otto Sittell 1879

Delhi, Hamilton Co.

Carpenter, Samuel William 1883

Delphos.

Evans, Hugh W. 1881
 Wahmhoff, Julius Henry 1880

Gallipolis.

Schaaf, Justice Henry 1875

Hamilton.

Schwartz, John C 1871

Logan.

Harrington, Frank 1869

Massillon, Stark Co.

Baltzly, Zachariah 1876
 Kirchhofer, Peter Paul 1881

Middletown.

Johnson, Charles Brayton 1876

Morristown.

Fisher, John Vance 1883

Napoleon.

Leist, Jacob L. 1881

Navarre.

Grossklaus, John Ferdinand 1859

New Madison, Darke Co.

Hagemann, James F. S. 1882

<i>North Baltimore, Wood Co.</i>		Blair, Henry Cowen	1868
Clark, Frank P.	1882	Borell, Henry Augustus	1874
<i>Salem, Columbiana Co.</i>		Boring, Edwin McCurdy.	1867
Hawkins, Michael Smith	1870	Bower, Henry	1860
<i>Sandusky.</i>		Bower, Henry Albert	1868
Graham, William Augustus	1876	Bowker, James	1876
<i>Springfield.</i>		Bullock, Charles	1857
Casper, Thomas Jefferson	1867	Bunting, Samuel Sellers	1857
Coblentz, Virgil	1882	Campbell, Hugh.	1876
Ludlow, Charles	1872	Campbell, Samuel.	1864
Siegenthaler, Harvey N.	1882	Cook, Thomas Penrose.	1877
Troupe, Theodore	1881	Dobbins, Edward Tompkins.	1867
<i>Tiffin.</i>		Eberle, Charles Louis	1865
Fleck, Jacob J.	1883	Eddy, Henry Clay	1869
Marquardt, Jacob F.	1881	<i>Ellis, Evan Tyson</i>	1857
<i>Toledo.</i>		England, Robert.	1868
Hohley, Charles	1872	Fox, Peter Paul	1869
Reed, Isaac Newton.	1881	Fruh, Carl Daniel Stephan	1876
<i>Troy.</i>		Gaillard, Edward	1876
Tobey, Charles William	1879	Genois, Louis.	1876
<i>Watertown.</i>		Gerhard, Samuel.	1873
Bohl, Conrad	1881	<i>Grahame, Israel Janney.</i>	1856
<i>West Liberty.</i>		Grove, John Eberly	1868
Kurfurst, Henry F.	1881	Haenchen, Charles Eugene	1865
<i>Wilmington.</i>		Hance, Edward H.	1857
Foland, Daniel J.	1881	Hancock, Charles W.	1868
<i>Wooster.</i>		Hassinger, Samuel Ellphat Reed	1880
Ohliger, Lewis Philip	1871	<i>Heintzelman, Joseph Augustus</i>	1858
<i>Youngstown.</i>		Hoskinson, J. Thomas, Jr.	1881
Nagle, Asher Christian.	1881	<i>Jenks, William J.</i>	1858
<i>Zanesville.</i>		Johnson, Benjamin Franklin	1859
Graham, Willis H.	1881	Jones, Alexander Henry	1874
Hatton, Edgar Melville	1878	Jones, David Sexton.	1859
OREGON.		Jones, Edward Charles.	1864
<i>Portland.</i>		Keasbey, Henry Griffith	1873
Sitton, Charles Edward.	1878	Keeney, Caleb Reynolds	1868
PENNSYLVANIA.		Keys, Roger	1868
<i>Philadelphia.</i>		Kline, Mahlon Norwood.	1876
Angney, John R.	1867	Koch, Louis	1872
Bakes, William Courtney	1864	Krewson, William Egbert	1875
Bauer, Louis Gustavus	1867	MAISCH, JOHN M.	1856
Blair, Andrew.	1865	Mattison, Richard Vornseleons	1873
		McIntyre, William	1868
		McKelway, George Irwin	1874
		<i>Mellor, Alfred</i>	1864
		Miller, Adolphus William	1868
		Milligan, Decatur.	1867
		Moore, Joachim Bonaparte	1860
		Moorhead, William Walker	1876
		Morris, Lemuel Iorwerth	1880
		Murray, Bernard James	1882
		Newbold, Thomas Mitchell.	1876

Ottinger, James Jeremiah	1876	<i>Bethlehem.</i>	
Parrish, Dillwyn	1870	Meyers, Edward Tobias	1867
Patterson, James Lemon	1876	<i>Bristol.</i>	
Perot, Thomas Morris	1857	Pursell, Howard	1880
Pile, Gustavus	1881	<i>Carlisle.</i>	
Preston, David	1868	Horn, Wilbur Fisk	1876
Procter, Wallace	1874	<i>Chambersburg.</i>	
REMINGTON, JOSEPH PRICE	1867	Cressler, Charles Henry	1868
Riley, Charles William	1868	<i>Columbia.</i>	
Rittenhouse, Henry Norman	1857	Meyers, James Alfred	1867
Robbins, Alonzo	1865	<i>Danville.</i>	
Roche, Edward Manning	1868	Sechler, James C.	1878
Rosengarten, Mitchell George	1869	<i>Derry Station.</i>	
Sayre, Lucius Elmer	1883	Thomas, George Massena	1883
Shivers, Charles	1860	<i>Easton.</i>	
Shinn, James Thornton	1860	Weaver, John Archibald	1873
Shoemaker, Richard Martin	1869	<i>Erie.</i>	
Shryock, Allen	1868	Nick, Frederick	1883
Simpers, John Wilmer	1874	<i>Franklin.</i>	
Slocum, Frank Leroy	1880	Riesenman, Joseph	1883
Somers, Richard Miller	1876	<i>Hanover, York Co.</i>	
Spannagel, Charles Christian	1874	Eckert, Edwin Gilbert	1883
Stewart, Francis Edward	1884	Snively, Andrew Jackson	1883
Taylor, Alfred Bower	1852	<i>Harrisburg.</i>	
Thompson, William Beatty	1858	George, Charles Theodore	1873
Thomson, William M.	1883	Gorgas, George Albert	1884
Trimble, Henry	1876	Gross, Edward Ziegler	1883
Troth, Samuel Fothergill	1857	Miller, Jacob Augustus	1873
Walsh, Robert Henry	1879	<i>Hyde Park, Luzerne Co.</i>	
Warner, William Richard	1857	Morgan, Benjamin George	1876
Webb, William H.	1867	<i>Lancaster.</i>	
Weber, William	1872	HEINITSH, CHARLES AUGUSTUS	1857
Weidemann, Charles Alexander	1868	<i>Lebanon.</i>	
Wendel, Henry Edward	1873	Karch, Joseph Jacob	1876
Wiegand, Thomas Snowdon	1857	Lemberger, Joseph Lyon	1858
Wilder, Hans Matthias	1866	Redsecker, Jacob Henry	1881
Wolff, Lawrence	1882	<i>Lewisburg, Union Co.</i>	
Worthington, Jeremiah Willits	1873	Schaffle, Samuel Wilson Wykoff	1876
Wright, Archibald Wesley	1868	<i>Lock Haven.</i>	
Zeilin, John Henry	1859	Prieson, Adolph	1880
<i>Alleghany City.</i>			
Armor, Alpheus	1882		
Eggers, Frederick Hermann	1872		
Robertson, Archibald C.	1882		
<i>Allentown.</i>			
Klump, Charles C.	1880		
<i>Beaver, Beaver Co.</i>			
Andriessen, Hugo	1875		
<i>Bellefonte, Centre Co.</i>			
Zeller, William S.	1881		

McKeesport.

Bochert, George 1883

Mansfield, Tioga Co.

Ridgway, Lemuel A. 1882

Milton.

Alleman, Emanuel Allison 1880

Minersville.

Burns, John Kellar 1876

New Brighton.

Kennedy, Thomas. 1880

Norristown.

Poley, Francis Henry 1880

Stahler, William 1880

Oil City.

Griffith, Albert Richard 1870

Griffith, Alphonso de Lamartine 1879

Pittsburg.

Beach, Clifton Hilliard 1883

Cherry, James Bonbright. 1868

Emanuel Louis. 1878

Holland, Samuel Smith 1876

Hostetter, Charles Michael 1870

Kelly, George A. 1882

Kerr, James, Jr. 1876

Nisbet, William Washington 1883

Schneider, Mathias Martin 1883

Wilson, Albert Hemphill 1883

Pittston.

Rhoades, Stephen Howard 1876

Pottsville.

Deibert, Thomas Irvin 1882

Kennedy, George Washington 1869

Quakertown.

Penrose, Stephen Foulke 1871

Reading.

Fox, Daniel Soder 1872

Raser, John Bernard 1872

Smith, Stephen Douglas 1883

Stein, Jacob Henry 1869

Ziegler, Philip Milton 1867

Scottdale, Westmoreland Co.

Cummings, Theodore Foster 1882

McNeil, John Murray 1882

Shippensburg.

Fleming, Frank Byerly 1883

Smethport, McKean Co.

Armstrong, Alvin Backus 1882

Tamaqua.

Albrecht, Emil 1875

Titusville.

Thompson, Ebenezer Kirk 1882

Towanda.

Porter, Henry Carroll 1880

West Chester.

Evans, Joseph Spragg 1877

White Haven.

Driggs, Charles M. 1881

Wilkesbarre.

Wolf, Nathaniel 1878

Williamsport.

Cornell, Edward Augustus 1873

Duble, Jesse Balderston 1870

York.

Patton, John Franklin 1880

RHODE ISLAND.

Newport.

BLACKMAN, LYMAN RAWSON 1865

Taylor, James Henry 1875

Providence.

Alfreds, Henry James 1883

Blanding, William Bullock 1875

Calder, Albert Layton 1859

Cone, John Wright 1876

Danforth, Edmund Culver 1878

Greene, William Ray 1883

Leith, Harvey Isaac 1883

Mason, Norman Nelson 1875

Reynolds, William Keyes 1876

Wood, Mason B. 1882

Westerley.

Collins, Albert Burlingame 1882

SOUTH CAROLINA.

Aiken.

Harbers, William Henry 1875

Charleston.

Aimar, Charles Pons 1879

Burnham, Edward Steinmeyer 1874

Eckel, Augustus William 1874
 Luhn, Gustavus Johann 1873
 Marsteller, George Ludwig 1883
 Michaelis, Charles Otto 1874
 Panknin, Charles Frederick 1874

Columbia.

Thomas, Oscar Ernest 1882

TENNESSEE.

Memphis.

Hessen, George Archibald 1880
 Robinson, James Scott 1869
 Safford, William Burr 1875

Nashville.

Laurent, Eugene Leonard 1872
 Thomas, James, Jr. 1875
 Wharton, John Criddle 1872
 Wharton, William Henry 1876

TEXAS.

Austin.

Morley, William Jarman 1876

Bryan.

McLelland, Robert Clayton 1880

Corsicana.

Campbell, John Gordon 1879

El Paso.

Irvin, William Armstrong 1879

Fort Worth.

Harper, Harry W. 1881
 Powell, Thomas Wallace 1874
 Wells, Ebenezer Miller 1878

Galveston.

Preston, Calvin Walbridge 1884

Marshall.

Lancaster, Edwin W. 1884

Waco.

King, Walter Blackburn 1883

VERMONT.

Brandon.

Crossman, George Alvin 1872

Burlington.

Van Patten, William James 1876

Chester.

Pierce, Frederick Webster 1879

Morrisville.

Gates, Amasa O. 1876

Rutland.

Higgins, Albert Warren 1870

Lewis, Elam Clark 1870

St. Johnsbury.

Bingham, Charles Calvin 1875

Randall, George Dallas 1875

White River Junction.

Trask, Charles Mitchell 1875

Windsor.

Paine, Milton Kendall 1875

VIRGINIA.

Danville.

Cole, H. W. 1882

Wiseman, Henry Adolphus 1883

Fredericksburg.

Hall, Marshall Carter 1870

Norfolk.

Jackson, Edward Calvert 1883

Masi, Frederick Henry 1873

Petersburg.

Knock, Thomas Franklin 1882

Richmond.

Baker, Thomas Roberts 1873

Blunt, Ira Washington 1873

Bodeker, Henry 1873

Purcell, John Barry 1875

Scott, William Henry 1873

WASHINGTON TERRITORY.

Seattle.

Kellogg, Gardner 1882

Walla Walla.

Holmes, Henry Elliott 1880

WEST VIRGINIA.

Charleston, Kanawha Co.

Boggs, Edwin Leslie 1872

Potterfield, Clarence A. 1882

Parkersburg.

Williams, Alfred Neveth 1883

<i>Wheeling.</i>	
Bocking, Edmund	1874
Gray, William Howlett	1880
McCullough, Winfield Scott	1880
Menkemeller, Charles	1880
Williams, William H.	1880
Young, Alexander Thomas	1876

WISCONSIN.

<i>Beloit.</i>	
Fenton, Frank S.	1881
<i>Eau Claire.</i>	
Godding, Edward Robert	1884
<i>Evansville, Rock Co.</i>	
Griswold, De Witt Clinton	1881
<i>Fond du Lac.</i>	
Huber, Jacob Charles	1880
<i>Fountain City.</i>	
Bechmann, Charles Richard	1882
<i>Geneva.</i>	
Miner, Morris Ashbel	1880
<i>Janesville.</i>	
Heimstreet, Edward Burton	1874
Prentice, Fred. F	1876
<i>Kenosha.</i>	
Robinson, Frederick	1881

<i>La Crosse.</i>	
Beyschlag, Charles	1880
<i>Madison.</i>	
Hollister, Albert H	1884
Power, Frederick Belding	1872
<i>Mayville, Dodge county.</i>	
Sauerhering, R	1884
<i>Milwaukee.</i>	
Abbott, Frank	1880
Conrath, Adam	1881
Crolius, Frank M	1884
Dadd, John Alfred	1880
Dohmen, Peter L	1884
Drake, John Ransom	1860
Gessler, Max	1884
Kienth, Hans	1884
Schranck, Henry Charles	1876
Senier, Frederick Sutherland	1874
<i>Neillsville.</i>	
Sniteman, Charles C.	1881
<i>Sheboygan.</i>	
Zaegel, Max Robert	1884
<i>Watertown.</i>	
Eberle, Herman Theodore	1875

DOMINION OF CANADA.

NEW BRUNSWICK.

<i>Kentville.</i>	
Masters, Robert Silas	1883
<i>Moncton.</i>	
Estey, Edwin M	1882

NOVA SCOTIA.

<i>Halifax.</i>	
Simson, Francis Cook	1876

ONTARIO.

<i>Goodrich.</i>	
Jordan, Frederick Francis	1877
<i>Lindsay.</i>	
Gregory, Edmund	1875

<i>London.</i>	
Saunders, William	1860
<i>Simcoe.</i>	
Foster, William Orville	1881
<i>Stratford.</i>	
Waugh, George James	1862
<i>Toronto.</i>	
Henderson, John	1877
Hodgetts, George	1877
Johnson, Stuart William	1881
Lander, John Cambridge	1877
Lowden, John	1875
Pearce, James H	1880
Robinson, William Sherlock	1877
Rose, Henry John	1872
<i>Windsor.</i>	
Priddy, Robert Samuel	1882

PRINCE EDWARD ISLAND.		Gray, Henry Robert	1867
<i>Charlottetown.</i>		Mason, Alfred Henry	1884
Dodd, Simon W.	1884	<i>Quebec.</i>	
QUEBEC.		McLeod, Roderick	1880
<i>Montreal.</i>		<i>Three Rivers.</i>	
Evans, Henry Sugden	1880	Williams, Richard Wellington . . .	1883

BERMUDA.

<i>Hamilton.</i>	
<i>Heyl, James B.</i>	1863

MEMBERS RESIDING IN EUROPE.

Burroughs, Silas Mainvielle, London, England.	1876
Wellcome, Henry Solomon, London, England.	1875

ALPHABETICAL LIST OF MEMBERS.

HONORARY MEMBERS.

- Attfield, Dr. John, Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London, W. C., England.
- Bentley, Dr. Robert, Professor of Materia Medica and Botany to the Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London, W. C., England.
- Brady, Henry B., F. R. S., Hillfield, Gateshead, England.
- Brunnengraeber, Dr. Christian, Rostock, Germany.
- Carteighe, Michael, F. I. C., 180 New Bond Street, London, W., England.
- Délondre, Dr. Augustin A., 20 Rue des Juifs, Paris, France.
- De Meyer, A. T., Bruxelles, Belgium.
- De Vrij, Dr. J. E., 54 Heerengracht, the Hague, Netherlands.
- Dragendorff, Dr. G., Professor of Pharmacy at the University of Dorpat, Russia.
- Duflos, Dr. Adolph, Professor, Annaberg, Germany.
- Flückiger, Dr. Frederick, Professor in the University of Strassburg, Germany.
- Gille, Norbert, Professor in the École Vétérinaire de l'Etat, Bruxelles, Belgium.
- Greenish, Thomas, F. C. S., 20 New Street, Dorset Square, London, N. W., England.
- Hager, Dr. Hermann, Pulvermühle bei Fürstenberg, Germany.
- Ince, Joseph, F. L. S., 11 St. Stephen's Avenue, Shepherd's Bush, W., London, England.
- Landerer, Dr. Xaver, Professor, Athens, Greece.
- Martenson, Magister J. von, Kinderhospital des Prinzen von Oldenburg, St. Petersburg, Russia.
- Martin, Stanislas, Paris, France.
- Planchon, Dr. G., Professor, Paris, France.
- Redwood, Dr. Theophilus, Professor of Pharmacy to the Pharmaceutical Society of Great Britain, 17 Bloomsbury Square, London, W. C., England.
- Reynolds, Richard, F. C. S., Cliff Lodge, Hyde Park, Leeds, England.
- Sandford, George W., 47 Piccadilly, London, W., England.
- Schacht, Dr. Carl, 56 Mittelstrasse, Berlin, N. W., Germany, England.
- Schacht, George F., F. C. S., 52 Royal York Cresct., Clifton, Bristol, England.
- Schaer, Dr. Edward, Professor of Pharmacy, Zurich, Switzerland.
- Sinimberghi, Cav. Niccola,, Via Condotti, Roma, Italy.
- Soubeiran, Dr. J. Léon, Professor of Pharmacy, École de Pharmacie, Montpellier, France.
- Waldheim, Anton von, 17, Himmelpfortgasse, Wien, I., Austria,
- Wittstein, Dr. G. C., 47 Königstrasse, München, Germany.

ACTIVE MEMBERS.

- Abbott, Frank, Milwaukee, Wis.
 Abernethy, Maxwell, No. 188 Newark avenue, Jersey City, N. J.
 Adams, Hazen W., No. 73 Main street, Hackensack, N. J.
 Addington, William B., No. 700 Olive street, St. Louis, Mo.
 Ade, Samuel G., No. 126 Milwaukee ave., Chicago, Ill.
 Ahlbrandt, Henry E., S. E. cor. Fifteenth and Carr streets, St. Louis, Mo.
 Aimar, Charles P., No. 469 King street, Charleston, S. C.
 Albrecht, Emil, Tamaqua, Pa.
 Alden, Charles P., No. 270 Main street, Springfield, Mass.
 Alexander, Maurice W., cor. Fourth and Market streets, St. Louis, Mo.
 Alfreds, Henry J., No. 311 Eddy street, Providence, R. I.
 Allaire, Charles B., No. 108 Main street, Peoria, Ill.
 Alleman, Emanuel A., care of Cyrus Brown, Milton, Pa.
 Aman, Henry, No. 139 East Main street, Rochester, N. Y.
 Anderson, Samuel, No. 48 Front street, Bath, Me.
 Andrews, Josiah H., S. E. cor. Chestnut and Second streets, Seymour, Ind.
 Andriessen, Hugo, P. O. Box 39, Beaver, Beaver county, Pa.
 Angney, John R., cor. Fifth and Spruce streets, Philadelphia, Pa.
 Armor, Alpheus, No. 57 Taylor avenue, Allegheny City, Pa.
 Armstrong, Alvin B., Smethport, McKean county, Pa.
 Armstrong, Andrew M., No. 106 East Market street, Akron, O.
 Arnold, Henry C., Kansas City, Mo.
 Ash, Matthew F., P. O. Box 129, Jackson, Miss.
 Aspinall, Walter A., Nos. 1147 and 1149 Fulton street, Brooklyn, N. Y.
 Asplin, John H., No. 227 Prospect street, Cleveland, O.
 Athey, J. Howard, Holly Springs, Miss.
 Atwood, Herman W., No. 846 Broadway, New York, N. Y.
 Atwood, Luther L., No. 7 North street, Pittsfield, Mass.
 Averill, William H., No. 435 Main street, Frankfort, Ky.
 Babo, Leopold, No. 12 Boylston street, Boston, Mass.
 Bailey, Frederick, P. O. Box 314, Lowell, Mass.
 Bain, Andrew W., City Hospital, Cincinnati, O.
 Baker, Edwin, Bridge street, Melbourne Falls, Mass.
 Baker, Grenville M., No. 487 Manhattan avenue, Greenpoint, Brooklyn, N. Y.
 Baker, T. Roberts, No. 919 East Main street, Richmond, Va.
 Bakes, William C., No. 145 North Tenth street, Philadelphia, Pa.
 Ball, Charles E., No. 221 High street, Holyoke, Mass.
 Ballard, John W., No. 106 West Second street, Davenport, Iowa.
 Balluff, Paul, No. 632 Sixth avenue, New York.
 Balser, Gustavus, No. 137 Avenue B, New York.
 Baltzly, Zacharias T., Opera Block, Massillon, O.
 Bartells, George C., Camp Point, Ill.
 Bartlett, Nicholas G., N. W. cor. Twenty-third street and Indian avenue, Chicago, Ill.
 Bartlet, William W., No. 675 Shawmut avenue, Boston, Mass.
 Bassett, Charles H., No. 504 Washington street, Boston, Mass.
 Bassett, Francis M., cor. Atlantic avenue and Court street, Brooklyn, N. Y.
 Bassett, John W., Tompkinsville, L. I., N. Y.
 Bassett, Joseph, No. 119 Market street, Salem, N. J.
 Bauer, Louis G., corner Fifth and Fairmount avenue, Philadelphia, Pa.
 Baumgartner, Frederick, Chillicothe, O.
 Baur, Jacob, Terre Haute, Ind.

- Baxley, J. Brown*, cor. Howard and Franklin streets, Baltimore, Md.
- Bayley, Augustus R., No. 607 Main street, Cambridgeport, Mass.
- Baylis, Lewis F., P. O. Box 34, Jamaica, Queens county, L. I., N. Y.
- Beach, Clifton H., cor. Shiloh and Sycamore streets, Pittsburgh, Pa.
- Bechmann, Charles R., Fountain City, Wis.
- Becker, Charles, No. 1367 Thirty-second street, West Washington, D. C.
- Beckman, Oscar A., No. 686 Broadway, cor. Baxter avenue, Louisville, Ky.
- Bedford, P. Wendover, P. O. Box 1807, New York, N. Y.
- Beebe, John Walter, Court and Plum streets, Cincinnati, O.
- Behre, Charles H. E., Schumann's Pharmacy, Atlanta, Ga.
- Belt, Z. James, No. 601 Market street, Wilmington, Del.
- Bendiner, Samuel J., No. 47 Third avenue, New York, N. Y.
- Benedict, James I., Pearl and Church streets, Cleveland, O.
- Benedict, Willis, No. 303 Congress avenue, New Haven, Conn.
- Benjamin, James H., No. 493 Tompkins avenue, Brooklyn, N. Y.
- Berrinn, George W.*, North Andover, Mass.
- Best, John, No. 1 German Block, Central City, Col.
- Betzler, Jacob, No. 121 Union street, Newark, N. J.
- Beyschlag, Charles, La Crosse, Wis.
- Billings, Henry M., No. 238 Greenwich street, New York, N. Y.
- Bingham, Charles C., No. 5 Bank Block, Main street, St. Johnsbury, Vt.
- Birchard, Abner T., Marshalltown, Iowa.
- BIROTH, HENRY, No. 111 Archer avenue, Chicago, Ill.
- Bishop, Francis M., Holley, Orleans county, N. Y.
- Bissell, Emery G., Main street, Waterville, Oneida county, N. Y.
- Bissell, John G., No. 45 Dominick street, Rome, N. Y.
- BLACKMAN, LYMAN R., No. 167 Thames street, Newport, R. I.
- Blahnik, Lorenz, No. 88 West Eighteenth street, Chicago, Ill.
- Blaikie, William, No. 202 Genesee street, Utica, N. Y.
- Blair, Andrew, cor. Eighth and Walnut streets, Philadelphia, Pa.
- Blair, Henry C., cor. Eighth and Walnut streets, Philadelphia, Pa.
- Blake, James E., No. 64 North Second street, New Bedford, Mass.
- Blanding, William B., Nos. 54 and 58 Weybosset street, Providence, R. I.
- Blank, Alois, No. 1353 South Fifth street, St. Louis, Mo.
- Blatchford, Eben*, No. 32 Main street, Rockport, Mass.
- Blocki, William F., No. 85 South Clark street, Chicago, Ill.
- Blunt, Ira W., Inner Court, between Eleventh and Twelfth and Main and Cary streets, Richmond, Va.
- Bochert, George, No. 87 Fifth street, McKeesport, Pa.
- Bocking, Edmund, No. 1 Odd Fellows' Hall, Wheeling, W. Va.
- Bodeker, Henry, cor. Fifteenth and East Main street, Richmond, Va.
- Boehm, Solomon, No. 800 Morgan street, St. Louis, Mo.
- Boggs, Edwin L., Kanawha Bank Building, Charleston, Kanawha county, W. Va.
- Bohl, Conrad, Watertown, O.
- Bolles, William P., No. 571 Dudley street, Boston, Mass.
- Bond, John B., Little Rock, Ark.
- Bond, Joseph R., New York, N. Y.
- Borell, Henry A., No. 2043 Chestnut street, Philadelphia, Pa.
- Boring, Edwin M., cor. Tenth street and Fairmount avenue, Philadelphia, Pa.
- Borland, Matthew W., No. 378 West Van Buren street, Chicago, Ill.
- Bower, Henry, cor. Gray's Ferry road and Twenty-ninth street, Philadelphia, Pa.
- Bower, Henry A., cor. Sixth and Green streets, Philadelphia, Pa.
- Bowker, James, cor. Sixth and Vine streets, Philadelphia, Pa.
- Boyce, Samuel F., Superior street and Third avenue, Duluth, Minn.
- Boyd, George W., C street, N. E., between Second and Third streets, Washington, D. C.

- Boyden, Edward C., cor. of Joy and Myrtle streets, Boston, Mass.
 Boynton, Herschell, No. 74 Main street, Biddeford, Maine.
 Brack, Charles, cor. Ensor and Forrest streets, Baltimore, Md.
 Brackett, Aurick S., No. 142 Montgomery street, San Francisco, Cal.
 Bradfield, Louis H., cor. Decatur and Pryor streets, Atlanta, Ga.
 Brant, Edmund W., 292 Broad street, Elizabeth, N. J.
 Brewer, Percival, Joliet, Ill.
 Brewster, Wadsworth J., Hannibal, N. Y.
 Bristol, Charles E., No. 48 Main street, Ansonia, Conn.
 Brooks, Francis M., Baton Rouge, La.
 Brooks, George W., No. 1161 Myrtle avenue, Brooklyn, N. Y.
 Broughton, Albert J., No. 64 Dominick street, Rome, N. Y.
 Brown, Albert P., cor. Fifth and Federal streets, Camden, N. J.
 Brown, Henry J., No. 2 Main street, Ann Arbor, Mich.
 Brown, Robert J., Leavenworth, Kan.
 Browne, Clarence E., No. 39 Harrison avenue, Boston, Mass.
 Browning, Woodville, Mound City, Mo.
 Bruce, James, No. 544 Prospect street, Cleveland, O.
 Bruck, Philip H., No. 24 N. High street, Columbus, O.
 Brugier, Francis, No. 557 Market street, Newark, N. J.
 Brunner, Norman I., cor. Fourth and Arch streets, Macon, Ga.
 Bryant, William C., Cedar Falls, Black Hawk county, Ia.
 Buck, Albert B., Anderson, Ind.
 Buck, George, S. W. cor. State and Madison streets, Chicago, Ill.
 Buck, John, No. 267 Broadway, Chelsea, Mass.
 Buck, John L., No. 267 Broadway, Chelsea, Mass.
 Buehler, Edward H., No. 170 William street, New York, N. Y.
 Buffington, Cyrus A., Hotel Block, Indianola, Ia.
 Bullard, George S., No. 98 Genesee street, Utica, N. Y.
 Bullock, Charles, No. 528 Arch street, Philadelphia, Pa.
 Buntin, William C., No. 600 Main street, Terre Haute, Ind.
 Bunting, Samuel S., cor. Tenth and Spruce streets, Philadelphia, Pa.
 Burdge, Jacob U., No. 482 Seventh avenue, New York, N. Y.
 Burge, James O., Bowling Green, Ky.
 Burley, Edwin P., No. 43 Temple Place, Boston, Mass.
Burnett, Joseph, No. 27 Central street, Boston, Mass.
 Burnham, Edward S., Charleston, S. C.
 Burns, J. Kellar, cor. Sunbury and Lecona streets, Minersville, Pa.
 Burrough, Horace, Baltimore, Md.
 Burroughs, Silas M., 8 Snow Hill, London, England.
 Bury, Edward B., No. 412 Eighth street, S. E., Washington, D. C.
 Bush, William, No. 56 Front street, Worcester, Mass.
 Butler, Freeman H., No. 141 Central street, Lowell, Mass.
 Butler, George F., Belle Plaine, Kan.
 Button, Charles E., No. 1558 Wabash avenue, Chicago, Ill.
 Cabell, George W., No. 211 Central avenue, Hot Springs, Ark.
 Cahill, John F., No. 119 Main street, Johnstown, N. Y.
 Calder, Albert L., No. 163 Westminster street, Providence, R. I.
 Caldwell, James W., No. 242 Grand River Avenue, Detroit, Mich.
 Calvert, John, S. E. cor. Kearney and Clay streets, San Francisco, Cal.
 Campbell, Horace W., No. 84 Front street, New York, N. Y.
 Campbell, Hugh, cor. Twenty-first and Locust streets, Philadelphia, Pa.
 Campbell, Isaac T., No. 239 West Broadway, Boston, Mass.
 Campbell, John G., Corsicana, Texas.
 Campbell, Samuel, No. 1412 Walnut street, Philadelphia, Pa.
 Campbell, William P., No. 61 Baltimore street, Cumberland, Md.
 Candidus, Philip C., cor. Dauphin and Cedar streets, Mobile, Ala.

- Canning, Henry, No. 90 Green street, Boston, Mass.
- Carle, John, Jr.*, No. 153 Water street, New York, N. Y.
- Carleton, Robert M., Somersworth, N. H.
- Carpenter, Samuel W., Delhi, Hamilton county, O.
- Carrell, Eugene A., Washington street, Morristown, N. J.
- Carslake, George M., S. W. cor. Farnsworth and Church streets, Bordentown, N. J.
- Carter, Solomon, No. 355 Washington street, Boston, Mass.
- Caspari, Charles, Jr., cor. Fremont and Baltimore streets, Baltimore, Md.
- Casper, Thomas J., No. 41 East Main street, Springfield, O.
- Catlin, Ephron, cor. Sixth street and Washington avenue, St. Louis, Mo.
- Chamberlain, Guilford T.*, St. Louis, Mo.
- Chandler, Charles F., cor. Fourth avenue and Fiftieth street., New York, N. Y.
- Chapin, William A., cor. Beach and Lincoln streets, Boston, Mass.
- Chapman, Isaac C., No. 111 Water street, Newburgh, N. Y.
- Cherry, James B., No. 23 Fourth avenue, Pittsburgh, Pa.
- Choate, John, No. 208 Main street, Fitchburg, Mass.
- Christiani, Charles, No. 484 Pennsylvania avenue, Washington, D. C.
- Clapp, Chambers B., No. 527 State street, Chicago, Ill.
- Clark, Albert B., Jr., No. 9 Main street, Galesburg, Ill.
- Clark, Frank P., North Baltimore, Wood county, O.
- Clarke, William B., Stockbridge, Mass.
- Clement, Henry B., No. 684 and 686 Broadway, Albany, N. Y.
- Close, George C., 67 Cumberland street, Brooklyn, N. Y.
- Cobb, Ralph L., No. 112 Superior street, Cleveland, O.
- Coblentz, Virgil, No. 167 West Main street, Springfield, O.
- Coffin, Samuel L., Chicago, Ill.
- Colcord, Joseph W., 153 Union street, Lynn, Mass.
- Colcord, Samuel M.*, Dover, Mass.
- Cole, H. W., Danville, Va.
- Colgan, John, cor. Tenth and Walnut streets, Louisville, Ky.
- Collins, Albert B., No. 48 Main street, Westerly, R. I.
- Collins, Louis D., No. 280 Greenwich street, New York, N. Y.
- Colton, James B., No. 766 Tremont street, Boston, Mass.
- Cone, John W., No. 48 North Main street, Providence, R. I.
- Conrath, Adam, No. 1330 State street, Milwaukee, Wis.
- Cook, George E., No. 111 Pike street, Port Jervis, N. Y.
- Cook, Thomas P., No. 838 North Ninth street, Philadelphia, Pa.
- Cordon, John G. M., Aberdeen, Miss.
- Cornell, Edward A., cor. Pine and Tenth Streets, Williamsport, Pa.
- Coumbe, Oscar H., cor. Tenth and F. streets, N. W., Washington, D. C.
- Cowdin, George H., No. 25 Union Square, Somerville, Mass.
- Cowdrey, Robert H., No. 527 State street, cor. Harmon Court, Chicago, Ill.
- Cox, David P., 801 Main street, Terre Haute, Ill.
- Cramer, Max, No. 1336 Tremont street, Boston, Mass.
- Cressler, Charles H., cor. Front and Main streets, Chambersburg, Pa.
- Crolius, Frank M., 13 Grand Avenue, Milwaukee, Wis.
- Cromwell, Zachariah S., No. 480 Pennsylvania avenue, Washington, D. C.
- Crossman, George A., No. 2 Simond's Block, Brandon, Vt.
- Culbreth, David M. R., cor. Charles and Eager streets, Baltimore, Md.
- Cummings, Henry T.*, No. 696 Congress street, Portland, Me.
- Cummings, Theodore F., Scottdale, Westmoreland county, Pa.
- Cunningham, A. P., Champaign, Ill.
- Currie, John H.*, No. 206 East Twenty-ninth street, New York, N. Y.
- Curtiss, Charles G., No. 833 De Kalb avenue, Brooklyn, N. Y.
- Curtman, Charles O., No. 3718 North Ninth street, St. Louis, Mo.

- CUTLER, EDWARD WALDO, No. 89 Broad street, Boston, Mass.
- Cutts, Foxwell C., Jr., No. 965 Fulton street, Brooklyn, N. Y.
- Dadd, John A., No. 221 Grand avenue, Milwaukee, Wis.
- Dale, William M., cor. Clark and Madison streets, Chicago, Ill.
- Dalrymple, Charles H., Washington street, Morristown, N. J.
- Dana, Edmund, Jr., No. 373 Congress street, Portland, Me.
- Danforth, Edmund C., No. 75 Randall street, Providence, R. I.
- Daniels, Samuel O., cor. Main and Summer streets, Natick, Mass.
- Darlington, James A., No. 326 Clinton street, Buffalo, N. Y.
- Darrough, Charles H., Main street, Red Bluff, Cal.
- Davenport, Bennett F., No. 751 Tremont street, Boston, Mass.
- Davis, Benjamin, No. 466 Grand street, New York, N. Y.
- Davis, Edward H., Rochester, N. Y.
- Davis, Edward L., cor. Union and Bates streets, Schenectady, N. Y.
- Davis, George R., Main street, E. Orange, N. J.
- Davis, Vincent, cor. Sixth and Chestnut streets, Louisville, Ky.
- Davis, William M., No. 689 De Kalb avenue, Brooklyn, N. Y.
- Dawson, Edward S., Jr., No. 13 South Salina street, Syracuse, N. Y.
- Dawson, John H., Twenty-third and Valencia streets, San Francisco, Cal.
- Day, Carlos E., No. 1002 Broadway, Brooklyn, N. Y.
- Daycock, William H., No. 649 Bedford avenue, Brooklyn, N. Y.
- De Cou, James C., No. 44 E. State street, Trenton, N. J.
- De Forest, William P., Fifth avenue, cor. Dean street, Brooklyn, N. Y.
- De Graff, David, No. 3 Broadway, Nyack, Rockland county, N. Y.
- De Huy, Bernard H., Second and Spruce streets, Abilene, Kan.
- Dearborn, George L., No. 156 Main street, New Market, N. H.
- Dedrick, W. Fred., Kingston, N. Y.
- Deibert, Thomas I., No. 103 North Centre street, Pottsville, Pa.
- Delavallade, Jean M., cor. Bank and Plaquemine streets, Plaquemine, La.
- Deléry, Edgar, P. O. Box 19, Bay St. Louis, Miss.
- Denham, Charles S., Main street, Rockland, Mass.
- Dennin, Charles, No. 33 Court street, Brooklyn, N. Y.
- Dick, Dundas, No. 37 Wooster street, New York, N. Y.
- Diehl, C. Lewis, cor. Third and Broadway, Louisville, Ky.
- Dikeman, Nathan, cor. Leavenworth and Dikeman streets, Waterbury, Ct.
- Dill, John B., Indianapolis, Ind.
- Dinsmore, George F., No. 41 Park street, Worcester, Mass.
- Ditman, Andrew J., No. 10 Astor House, New York, N. Y.
- Dobbins, Edward T., No. 1412 Walnut street, Philadelphia, Pa.
- Dohme, Charles E., cor. Pratt and Howard streets, Baltimore, Md.
- Dohme, Louis, cor. Pratt and Howard streets, Baltimore, Md.
- Dohmen, Peter L., 149 Reed street, Milwaukee, Wis.
- Dodd, Simon W., Queen street, Charlotte-town, P. E. I.
- Doliber, Thomas, No. 41 Central Wharf, Boston, Mass.
- Dougherty, Samuel E., No. 65 Brinkerhoff street, Jersey City, N. J.
- Douglass, Henry, Jr., No. 68 Wythe avenue, Brooklyn, N. Y.
- Drake, Charles W., No. 275 Main street, Middleboro, Mass.
- Drake, Jonathan B., No. 132 Broad street, Elizabeth, N. J.
- Drake, John R., No. 255 S. Water street, Milwaukee, Wis.
- Drefs, Charles A., No. 166 Broadway, Buffalo, N. Y.
- Dreher, Ernest, No. 953 Broad street, Newark, N. J.
- Dreher, Louis, No. 302 Euclid avenue, Cleveland, O.
- Drew, John W., No. 901 Pennsylvania avenue, Washington, D. C.
- Driggs, Charles M., White Haven, Pa.

- Driggs, Nathaniel S., Indianapolis, Ind.
- Drown, Lowell A., P. O. Box 102, Taunton, Mass.
- Drury, Linus D., cor. Warren and Dudley streets, Boston, Mass.
- Duble, Jesse B., cor. Pan and Fourth streets, Williamsport, Pa.
- Du Bois, William L., No. 281 Main street, Catskill, N. Y.
- Du Puy, Eugene*, 1150 Fulton avenue, Brooklyn, N. Y.
- Duckett, Walter G., cor. Twenty-second street and Pennsylvania avenue, Washington, D. C.
- Dudley, Oscar E., No. 62 E. One Hundred and Twenty-fifth street, New York, N. Y.
- Dufour, Clarence R., No. 1814 Fourteenth street, Washington, D. C.
- Dunn, John A., No. 56 Dougherty street, Brooklyn, N. Y.
- Durban, S. C., Augusta, Ga.
- Dykeman, George A., Catskill, N. Y.
- Eareckson, Edwin, cor. Baltimore and High streets, Baltimore, Md.
- Earnshaw, William J., No. 38 Huron street, Indianapolis, Ind.
- Eastman, Charles S., N. E. cor. Main and Depot streets, Concord, N. H.
- Easton, Luther W., Union near Webster street, Rockland, Mass.
- Eberbach, Ottmar, No. 12 South Main street, Ann Arbor, Mich.
- Eberle, Charles L., No. 4779 Germantown avenue, Philadelphia, Pa.
- Eberle, Herman T., care G. E. Eberle & Son, Watertown, Wis.
- EBERT, ALBERT E., cor. Madison and Halsted streets, Chicago, Ill.
- Eckel, Augustus W., No. 231 King street, Charleston, S. C.
- Eckert, Edwin G., Fred street, Hanover, Pa.
- Eckford, Joseph Wm., Commerce street, Aberdeen, Miss.
- Eddy, Henry C., cor. Eighteenth and Lombard streets, Philadelphia, Pa.
- Eddy, Charles H., Main street, Great Barrington, Mass.
- Edwards, Nathan W., Main street, Fairmount, Ind.
- Edwards, William F., No. 334 East Baltimore street, Baltimore, Md.
- Eger, George, Nos. 839 and 841 Central avenue, Cincinnati, O.
- Eggers, Frederick H., No. 72 Ohio street, Allegheny City, Pa.
- Eimer, Charles, No. 205 Third avenue, New York, N. Y.
- Elbe, Constantine B., Webster street and Santa Clara avenue, Alameda, Cal.
- Elfers, Joseph C., No. 42 Budd street, Cincinnati, O.
- Eliel, Leo, South Bend, Ind.
- Elliott, Henry A., No. 286 Lexington street, Baltimore, Md.
- Ellis, Evan T.*, No. 133 South Front street, Philadelphia, Pa.
- Emanuel, Louis, cor. Second and Grant streets, Pittsburgh, Pa.
- Emerson, Charles B., cor. Merrimac and Bridge streets, Haverhill, Mass.
- Emerson, Isaac E., cor. Gilmore street and Lafayette avenue, Baltimore, Md.
- Emich, Columbus V., No. 136 North Howard street, Baltimore, Md.
- England, Robert, No. 800 South Tenth street, Philadelphia, Pa.
- Eschmann, F. W. R., Yonkers, N. Y.
- Estes, Joseph, cor. Union and Church streets, Rockland, Mass.
- Estey, Edwin M., Moncton, New Brunswick.
- Evans, H. Sugden, 41 St. John Baptiste street, Montreal, Canada.
- Evans, Hugh W., Delphos, O.
- Evans, Joseph S., P. O. Box 657, West Chester, Pa.
- Evans, Samuel B., Circleville, O.
- Fairchild, Benjamin T., 60 Fulton street, New York, N. Y.
- Faust, Charles, S. E. cor. Elm and Liberty streets, Cincinnati, O.
- Featherston'h, Edward R., No. 1203 Choutan avenue, St. Louis, Mo.
- Fecmster, Joseph H., No. 99 Walnut street, Cincinnati, O.
- Feeny, James, Bay and Thompson streets, Stapleton, S. I., N. Y.
- Fenner, William R., care of W. D. Hoyt & Co., Rome, Ga.
- Fenton, Frank S., Beloit, Wis.
- Ferdinand, George A., Dubuque, Ia.
- Feth, Joseph G., cor. Madison and Columbia streets, Newport, Ky.

- Fickling, Charles H., No. 1260 Thirty-second street, West Washington, D. C.
- Field, Amos, No. 26 Vine street, Macon, Mo.
- Finkel, Charles E., No. 4 Main street, Yonkers, N. Y.
- Finlay, Alexander K., New Orleans, La.
- Finlay, John P., Greenville, Miss.
- Fischer, Phil, No. 848 West Market street, Louisville, Ky.
- Fish, Charles F., No. 104 Broadway, Saratoga Springs, N. Y.
- Fisher, Amos S., Bergen, N. Y.
- Fisher, John N., Odd Fellows' Hall, Morristown, O.
- Fisher, William, No. 327 Bleeker street, New York, N. Y.
- Flanagan, Lewis C., No. 589 Somerville avenue, Somerville, Mass.
- Fleck, Jacob J., cor. Washington and Perry streets, Tiffin, O.
- Fleming, Frank B., No. 7 West Main street, Shippensburg, Pa.
- Foland, Daniel J., Wilmington, O.
- Follansbee, Sherman, No. 549 Shawmut avenue, Boston, Mass.
- Ford, James M., Kansas City, Mo.
- Ford, W. Thomas, No. 1305 Cherry street, Kansas City, Mo.
- Foster, William O., Simcoe, Ontario, Can.
- Fougera, C. Edmund, cor. Broadway and Thirtieth street, New York, N. Y.
- Foulke, James, No. 250 Washington street, Jersey City, N. J.
- Fox, Daniel S., 323 Franklin street, Reading, Pa.
- Fox, Peter P., No. 2300 Spruce street, Philadelphia, Pa.
- Frames, James P., cor. Gray and Aisquith streets, Baltimore, Md.
- Francis, Walter R., No. 170 Orange street, New Haven, Conn.
- Fraser, Edward A., No. 20 College Place, New York, N. Y.
- Frauer, Herman E., No. 246 East Washington street, Indianapolis, Ind.
- Frazee, George B., No. 316 Curtis street, Denver, Col.
- French, George W., No. 360 Washington street, Boston, Mass.
- French, William B., No. 10 State street, Albany, N. Y.
- Frere, Alexander G., Main street, Franklin, La.
- Frey, John, Bellevue Hospital, New York, N. Y.
- Frohwein, Richard, No. 122 First street, Elizabethport, N. J.
- Frost, James, Nos. 169, 171, 173 Georgia Street, Vallejo, Solano county, Cal.
- Frothingham, Edward G., Jr., Elm street, cor. Main and Water, Haverhill, Mass.
- Früh, Carl D. S., No. 2321 Ridge avenue, Philadelphia, Pa.
- Frye, George G., No. 320 Congress street, Portland, Me.
- Fuller, Henry W., No. 220 Randolph street, Chicago, Ill.
- Fuller, Oliver F., No. 220 Randolph street, Chicago, Ill.
- Gaillard, Edward, No. 1802 North Eleventh street, Philadelphia, Pa.
- Gale, Edwin O.*, No. 85 South Clark street, Chicago, Ill.
- Gale, William H.*, No. 85 South Clark street, Chicago, Ill.
- Gallagher, Charles K.*, Second street, Washington, N. C.
- Gallagher, John A., Kansas City, Mo.
- Galt, Edward P., 34 Bond St., Selma, Ala.
- Gardner, Charles H., New York, N. Y.
- Gardner, Robert W., New York, N. Y.
- Garrett, Oscar N., Joplin, Jasper county, Mo.
- Garrigues, Samuel S.*, Ann Arbor, Mich.
- Garrison, Herod D., No. 3510 Vincennes avenue, Chicago, Ill.
- Gates, Howard E., Litchfield, Conn.
- Gates, Amasa O., Morrisville, Vt.
- Gaus, Charles H., No. 202 Washington avenue, Albany, N. Y.
- Gaus, Louis H., No. 254 South Pearl street, Albany, N. Y.
- Gaylord, Henry C., No. 110 Monument square, Cleveland, O.
- Gegelein, Frederick L., Payne and Case avenues, Cleveland, O.
- Geier, Oscar W., No. 175 Main street, Carrollton, Ky.
- Genois, Louis, No. 1412 Walnut street, Philadelphia, Pa.
- George, Charles T., No. 1306 North Third street, Harrisburg, Pa.
- Gerhard, Samuel, cor. Hanover and Belgrade streets, Philadelphia, Pa.

- Gessler, Max, 293 Pierce street, Milwaukee, Wis.
- Gessner, Emil A., No. 301 Chapel street, New Haven, Conn.
- Gibson, Charles, No. 74 State street, Albany, N. Y.
- Gill, George, P. O. Box 17, Mount Vernon, N. Y.
- Glines, George W., No. 147 Franklin avenue, Cleveland, O.
- Godding, Edward R., Bridge street, Eau Claire, Wis.
- Godding, John G., cor. Berkeley and Boylston streets, Boston, Mass.
- Goebel, Edward, Louisville, Ky.
- Gonaux, François, Houma, La.
- Good, James M., No. 2348 Olive street, St. Louis, Mo.
- Goodale, Harvey G., No. 207 Atlantic avenue, Brooklyn, N. Y.
- Goodale, Thomas T., No. 39 Tremont street, Boston, Mass.
- Goodman, Charles F., No. 180 Farnham street, Omaha, Neb.
- Goodman, Emanuel, cor. Sixth and Elm streets, Cincinnati, O.
- Goodrich, Stephen, care of L. G. Moses & Co., Hartford, Conn.
- Goodwin, Lester H., cor. State and Main streets, Hartford, Conn.
- Goodwin, William W., Newburyport, Mass.
- Gordon, William J. M., No. 142 Walnut street, Cincinnati, O.
- Gorgas, George A., 6 Market Square, Harrisburg, Pa.
- Gorham, John R., Jr., No. 79 Water street, Newburgh, N. Y.
- Gosman, Adam J., cor. Charles and Mulberry streets, Baltimore, Md.
- Graham, William A., No. 30 Columbus avenue, Sandusky, O.
- Graham, Willis H., No. 144 Main street, Zanesville, O.
- Grahame, Israel J., cor. Twelfth and Filbert streets, Philadelphia, Pa.
- Grandjean, Charles, No. 2828 North Fourteenth street, St. Louis, Mo.
- Grandjean, Eugene, No. 2828 North Fourteenth street, St. Louis, Mo.
- Grassly, Charles W., 287 West Twelfth street, Chicago, Ill.
- Gray, Gilbert D., Glenwood, Mo.
- Gray, Henry R., No. 144 St. Lawrence Main street, Montreal, Quebec, Can.
- Gray, William H., No. 1139 Market street, Wheeling, W. Va.
- Green, Arthur L., Ann Arbor, Mich.
- Greene, William R., 1 Westminster street, Providence, R. I.
- Gregory, Edmund, Kent street, Lindsay, Ontario, Canada.
- Greve, Theodore L., cor. John and Sixth streets, Cincinnati, O.
- Greyer, Julius, S. W. cor. Vine and Findlay streets, Cincinnati, O.
- Gridley, Junius, No. 87 Maiden Lane, New York, N. Y.
- Griffith, Albert R., No. 33 Centre street, Oil City, Pa.
- Griffith, Alphonso De L., No. 33 Centre street, Oil City, Pa.
- Griffith, Hiram E., Grant's Block, Niagara Falls, N. Y.
- Griffith, William H., No. 146 Second avenue, New York, N. Y.
- Griswold, De Witt C., Evansville, Wis.
- Gross, Edward Z., No. 119 Market street, Harrisburg, Pa.
- Grossklauss, John F., cor. High street and Public Square, Navarre, O.
- Grosvenor, Daniel P., Jr., No. 35 Main street, Peabody, Mass.
- Grove, John E., No. 3326 Germantown avenue, Philadelphia, Pa.
- Gundrum, George, Ionia, Mich.
- Guy, George O., 428 West Van Buren street, Chicago, Ill.
- Haag, Julius A., Denison House, Indianapolis, Ind.
- Haass, G. Herman, No. 38 East Main street, Rochester, N. Y.
- Haber, Louis A., No. 283 St. Clair street, Cleveland, O.
- Hadley, Frank R., No. 64 North Second street, New Bedford, Mass.
- Haenchen, Charles E., No. 3838 Haverford street, Philadelphia, Pa.
- Hageman, James F. S., Washington street, New Madison, Darke county, O.
- Haight, William B., care Lockwood & Haight, Bogardus, Stamford, Conn.
- Hale, Frederick, Brooklyn, N. Y.
- Hall, Charles E., Greenville, N. H.

- Hall, Edwin B., Wellsville, Allegheny county, N. Y.
- Hall, Marshall C., care Hall Brothers, Fredericksburg, Va.
- Hallberg, Carl S. N., No. 25 Michigan avenue, Chicago, Ill.
- Hamilton, Emil, No. 3037 Indiana avenue, Chicago, Ill.
- Hance, Edward H., cor. Callowhill and Marshall streets, Philadelphia, Pa.
- Hancock, Charles W., No. 3425 Spring Garden street, Philadelphia, Pa.
- Hancock, John F., cor. Baltimore street and Broadway, Baltimore, Md.
- Hancock, John H., No. 182 Fulton street, New York, N. Y.
- Hanson, Dominicus, Central Square, Rochester, N. Y.
- Hanson, Willis T., No. 195 State street, Schenectady, N. Y.
- Harbers, William H., Laurens street, Aiken, S. C.
- Hardigg, William L., Second near Main street, Uniontown, Ky.
- Hardin, John H., Wilmington, N. C.
- Harlow, Noah S., No. 4 Smith's Block, Bangor, Me.
- Harper, Frank M., No. 45 East Main street, Madison, Ind.
- Harper, Harry W., Fort Worth, Texas.
- Harries, Oscar L., No. 263 Washington street, Buffalo, N. Y.
- Harrington, Frank, Werland's Block, Main street, Logan, O.
- Harrison, Jacob H., 305 Brady street, Davenport, Ia.
- Hartness, William H., No. 109 Ontario street, Cleveland, O.
- Hartshorn, Frederick A., Marlborough, Mass.
- Hartung, Hugo R., No. 230 Fifteenth street, Denver, Col.
- Hartwig, Charles F., Chicago, Ill.
- Harwood, Frank L., Main street, Warren, Mass.
- Hassebrock, Henry F., 1000 North High street, St. Louis, Mo.
- Hassencamp, Ferdinand, No. 75 Hanover street, Baltimore, Md.
- Hassinger, Samuel E. R., N. E. cor. Fairmount avenue and Twenty-third street, Philadelphia, Pa.
- Hatch, Eugene F., Goldsboro, N. C.
- Hattenhauer, Robert C., Peru, Ill.
- Hatton, Edgar M., cor. Main and Fifth streets, Zanesville, O.
- Hauenstein, William, Bluffton, O.
- Haviland, Henry*, New York, N. Y.
- Hawkins, Henry, cor. Hastings and Brewster streets, Detroit, Mich.
- Hawkins, Joseph T., N. W. cor. Dearborn and Minor streets, Mobile, Ala.
- Hawkins, M. Smith, No. 20 Broadway, Salem, Columbiana county, O.
- Hay, Henry H.*, cor. Free and Middle streets, Portland, Me.
- Hayes, Horace P., No. 312 Elk street, Buffalo, N. Y.
- Hays, David, No. 207 Division street, New York, N. Y.
- Hazen, Peter P., Cornwall, Orange county, N. Y.
- Hechler, George L., No. 774 Broadway, Cleveland, O.
- Hegeman, J. Niven, 756 Broadway, New York, N. Y.
- Heimstreet, Edward B., care of S. Heimstreet & Son, Janesville, Wis.
- Heinemann, Otto, cor. Laurel and Lynn streets, Cincinnati, O.
- HEINITSH, CHARLES A., No. 16 East King street, Lancaster, Pa.
- Heintzelman, Joseph A.*, cor. Ridge avenue and Master street, Philadelphia, Pa.
- Heller, Ludwig, 241 Milwaukee avenue, Chicago, Ill.
- Helman, Charles M., cor. Findlay and Baymiller street, Cincinnati, O.
- Hemm, Francis, South St. Louis, Mo.
- Henderson, John, Toronto, Can.
- Henes, William F., No. 221 Randolph street, Chicago, Ill.
- Henry, Charles (Dworniczak), Croton Landing, N. Y.
- Hepburn, John, No. 93 Main street, Flushing, N. Y.
- Herbst, Frederick W., Columbus, O.
- Hermann, John G., cor. Baltimore and Mechanic streets, Cumberland, Md.
- Hessen, George A., No. 220 Poplar street, Memphis, Tenn.
- Heuermann, Henry W., No. 120½ Claiborne avenue, Chicago, Ill.
- Heun, Emil, Cincinnati, O.

Heydenreich, Emile, No. 169 Atlantic avenue, Brooklyn, N. Y.

Heyl, James B., Vice-Consul, Hamilton, Bermuda.

Higgins, Albert W., No. 41 Merchants' Row, Rutland, Vt.

Higgins, James S., No. 24 De Lancey street, New York, N. Y.

Hildreth, Charles F., No. 54 Main street, Suncook, N. H.

Hildreth, Newton G., Cheviot, Cincinnati, O.

Hill, James W. H., Saugus, Mass.

Hilt, David, No. 84 Main street, Lafayette, Ind.

Hinsdale, Samuel J., Market Square, Fayetteville, N. C.

Hobart, Charles H., No. 10 Gold street, New York, N. Y.

Hodgetts, George, No. 305 Yonge street, Toronto, Ontario, Can.

Hoffman, Frederick, No. 183 Broadway, New York, N. Y.

Hoffman, Otto L., cor. Fourth and Town streets, Columbus, O.

Hogey, Julius H., No. 441 State street, Chicago, Ill.

Hohenthal, Charles F. L., No. 857 Third avenue, New York, N. Y.

Hohly, Charles, No. 248 South St. Clair street, Toledo, O.

Holland, Samuel P., cor. Smithfield and Liberty streets, Pittsburgh, Pa.

Hollister, Albert H., 25 Pinckney street, Madison, Wis.

Holmes, Clayton W., No. 122 Lake street, Elmira, N. Y.

Holmes, Henry E., No. 19 Main street, Walla-Walla, Wash. Ter.

Holzhauser, Charles, No. 787 Broad street, Newark, N. J.

Hood, Charles L., cor. Merrimac and Central streets, Lowell, Mass.

Hopp, Lewis C., cor. Euclid avenue and Erie street, Cleveland, O.

Hopper, George S., Hume, Allegheny county, N. Y.

Horn, Wilbur F., No. 32 West Main street, Carlisle, Pa.

Hoskinson, J. Thomas, Jr., Front and Norris streets, Philadelphia, Pa.

Hostetter, Charles M., No. 272 Penn avenue, Pittsburgh, Pa.

Howson, Walter H., Water street, Chillicothe, O.

Hoyt, George M., No. 257 Columbus avenue, Boston, Mass.

Huber, Jacob C., No. 450 Main street, Fond du Lac, Wis.

Hubbard, John H., No. 468 Harvard street, Cambridge, Mass.

Huddart, John F., Second and Chestnut streets, Louisville, Ky.

Hudnut, Alexander, No. 218 Broadway, New York, N. Y.

Hudson, Arthur, Centre street, Newton, Mass.

Husted, Alfred B., No. 77 Eagle street, Albany, N. Y.

Huhn, George, 123 Nicollet street, Minneapolis, Minn.

Hunt, Leonard W., Fourth street, Macon, Ga.

Hurley, John, Monroe street, Little Falls, Herkimer county, N. Y.

Hurt, James F., Broadway, Columbia, Mo.

Hurty, John N., No. 104 North Penn street, Indianapolis, Ind.

Huston, Charles, No. 43 South High street, Columbus, O.

Hutchins, Isaiah, M. D., West Acton, Mass.

Ihlefeld, Conrad H., No. 715 Eighth avenue, New York, N. Y.

Imgard, Julius, No. 586 Sixth avenue, New York, N. Y.

Ingalls, John, cor. Fourth and Poplar streets, Macon, Ga.

Inness, George, No. 45 University Place, New York, N. Y.

Irvin, William A., El Paso, Texas.

Jacobs, Joseph, Marietta and Peachtree streets, Atlanta, Ga.

Jacobus, Judson S., cor. Thirty-first street and Indiana avenue, Chicago, Ill.

Jackson, Edward C., 140 Freemason street, Norfolk, Va.

JACQUES, GEORGE W., cor. Broadway and Augusta street, S. Amboy, N. J.

James, William T., No. 103 Main street, Flushing, N. Y.

Jefferson, John H. B., No. 96, South Broadway, Baltimore, Md.

Jenkins, Luther L., No. 119 Leverett street, Boston, Mass.

Jenks, William J., No. 160 North Third street, Philadelphia, Pa.

- Jennings, N. Hynson, No. 90 North Charles street, Baltimore, Md.
- Jesson, Jacob, cor. Western avenue and Jefferson street, Muskegon, Michigan.
- Johnson, Benjamin P., No. 304 East Girard avenue, Philadelphia, Pa.
- Johnson, Charles B., Third street, Middletown, O.
- Johnson, Edward L., Tenth avenue, cor. One Hundred and Fifty-seventh street, New York, N. Y.
- Johnson, Henace J., 1 Rumford Building, Main street, Waltham, Mass.
- Johnson, Stuart W., Toronto, Ontario, Can.
- Johnson, William*, Nos. 153 and 155 Jefferson avenue, Detroit, Mich.
- Johnston, Harry A., 1001 O street N. W., Washington, D. C.
- Jones, Alexander H., Ninth and Parrish streets, Philadelphia, Pa.
- Jones, Charles K., Leffingwell and Washington avenue, St. Louis, Mo.
- Jones, Daniel S., Twelfth and Spruce streets, Philadelphia, Pa.
- Jones, Edward C., S. E. cor. Fifteenth and Market streets, Philadelphia, Pa.
- Jones, James T., No. 855 East Fourth street, Boston, Mass.
- Jones, Simon N., First and Jefferson streets, Louisville, Ky.
- Jones, Thomas, No. 1060 and 1062 Fulton street, Brooklyn, N. Y.
- Jordan, F. Francis, Court-house Square, Goodrich, Ontario, Can.
- Jordan, William H., No. 653 Congress street, Portland, Me.
- Joy, Edwin W., 852 Market street, San Francisco, Cal.
- JUDGE, JOHN F., near cor. Court and Cutter streets, Cincinnati, O.
- Jungmann, Julius, 1047 Third avenue, New York, N. Y.
- Kadlec, Lawrence W., No. 136 W. Twelfth street, Chicago, Ill.
- Kalish, Julius, No. 409 Grand street, New York, N. Y.
- Kannal, Emmet, Rensselaer, Ind.
- Karb, George J., Fourth and Main streets, Columbus, O.
- Karch, Joseph L., Ninth and Cumberland streets, Lebanon, Pa.
- Karrman, William, Cincinnati, O.
- Kauffman, George B., No. 47 East Spring street, Columbus, O.
- Keasby, Henry G., No. 332 North Front street, Philadelphia, Pa.
- Keeler, William H., P. O. Box 585, Saginaw City, Mich.
- Keeney, Caleb R., Sixteenth and Arch streets, Philadelphia, Pa.
- Keiper, Louis, No. 780 Lorain street, Cleveland, O.
- Kelley, Edward S., Boylston and Berkeley streets, Boston, Mass.
- Kellogg, Gardner, Mill and Commercial streets, Seattle, Wash. Ter.
- Kelley, George A., Wood street and First avenue, Pittsburgh, Pa.
- Kennard, Frank W., No. 1312 Harney street, Omaha, Neb.
- Kennedy, George W., No. 103 North Centre street, Pottsville, Pa.
- Kennedy, Thomas, Broadway, New Brighton, Pa.
- Kent, Henry A., Jr., cor. E. Broad street and Jefferson avenue, Elizabeth, N. J.
- Kent, Robert R.*, Opopka, Orange county, Fla.
- Keppler, Christian L., No. 461 Dryades street, New Orleans, La.
- Kerr, James, Jr., No. 402 Smithfield street, Pittsburgh, Pa.
- Kessler, Edward F., cor. Twentieth and Market streets, Louisville, Ky.
- Keys, Roger, Twelfth and Pine streets, Philadelphia, Pa.
- Kidder, Samuel*, No. 35 Nesmith street, Lowell, Mass.
- Kienth, Hans, No. 608 Mitchell street, Milwaukee, Wis.
- Kimmel, Henry, No. 65 Avenue A, New York, N. Y.
- KING, JAMES T., Main and South streets, Middletown, N. Y.
- King, Walter B., No. 47 Austin avenue, Waco, Texas.
- Kirchhofer, P. Paul, Massillon, Stark county, Ohio.
- Kitchen, Charles W., cor. Fulton and Washington streets, Brooklyn, N. Y.
- Klayer, Louis, Ninth and Elm streets, Cincinnati, O.
- Klie, G. H. Charles, Bellefontaine Road, Lowell, N. St. Louis, Mo.

- Kline, Mahlon N., Nos. 309 and 311 North Third street, Philadelphia, Pa.
- Klump, Charles C., Allentown, Lehigh County, Pa.
- KLUSSMANN, HERMANN, cor. Fourth street and Lafayette avenue, Hoboken, N. J.
- Knabe, Gustavus A., No. 484 Pennsylvania avenue, Washington, D. C.
- Knapp, Frank F., No. 362 Hudson street, New York, N. Y.
- Knight, George E., No. 12 Liberty street, Bath, N. Y.
- Knock, Thomas F., Petersburg, Va.
- Knoebel, Edmund, Public Square, Highland, Ill.
- Knoefel, August, New Albany, Ind.
- Koch, Louis, cor. Fourth and Wood streets, Philadelphia, Pa.
- Koehnken, Herman H., cor. Third and Mill streets, Cincinnati, O.
- Krehbiel, Gustavus, No. 156 East Forty-eighth street, New York, N. Y.
- Krehe, J. Theodore, 314 East Second street, Muscatine, Iowa.
- Krewson, William E., cor. Eighth and Montgomery streets, Philadelphia, Pa.
- Krieger, Philip, cor. Myrtle and Marcey streets, Brooklyn, N. Y.
- Kuerze, Robert M., N. W. cor. Eighth and Depot streets, Cincinnati, O.
- Kuhn, Norman A., No. 124 South Fifteenth street, Omaha, Neb.
- Kurfurst, Henry F., West Liberty, Logan county, O.
- Laber, Julius, No. 874 Third avenue, New York, N. Y.
- Lahme, Charles A., Kansas City, Mo.
- Laird, William R., No. 250 Washington street, Jersey City, N. J.
- Lambert, John A., No. 450 West Michigan street, Indianapolis, Ind.
- Lammert, C. Joseph, No. 32 Milton street, Cincinnati, O.
- Lancaster, Edwin W., Marshall, Tex.
- Land, Robert H., No. 270 Broad street, Augusta, Ga.
- Lander, John C., Yorkville, Toronto, Can.
- Latimer, Robert F.*, Jackson, Mich.
- Lauer, Michael J., No. 275 Mulberry street, Baltimore, Md.
- Laurent, Eugene L., No. 27 Cedar street, Nashville, Tenn.
- Lautenbach, Robert, cor. Eutaw and Saratoga streets, Baltimore, Md.
- Lavigne, Jean B., No. 265 North Poydras street, New Orleans, La.
- Lawton, Charles H., No. 91 Union street, New Bedford, Mass.
- Lawton, Horace A., No. 91 Union street, New Bedford, Mass.
- Lazell, Lewis T., No. 10 Gold street, New York, N. Y.
- Lee, James A., Main street, New Iberia, La.
- Lee, James H., Court Square, Ashville, N. C.
- Lehn, Louis, No. 160 William street, New York, N. Y.
- Leis, George, No. 90 Massachusetts street, Lawrence, Kan.
- Leist, Jacob L., Napoleon, O.
- Leitch, Arthur*, care of E. Shendell, St. Louis, Mo.
- Leith, Harvey J., 282 North Main street, Providence, R. I.
- Lemberger, Joseph L., No. 8 North Ninth street, Lebanon, Pa.
- Lengfeld, Abraham L., cor. Gay and Stockbridge streets, San Francisco, Cal.
- Levy, Adolph, No. 125 Grand street, E.D., Brooklyn, N. Y.
- Lewis, Benjamin, No. 21 Canal street, New Orleans, La.
- Lewis, Elam C., No. 2 West, cor. Merchants' Row, Rutland, Vt.
- Lewis, Samuel E., Fourteenth and P streets, N. W., Washington, D. C.
- Libby, Henry T., Main street, Pittsfield, Me.
- Lillie, Charles H., Main street, Great Barrington, Mass.
- Lilly, Eli, No. 36 South Meridian street, Indianapolis, Ind.
- Lincoln, Henry W.*, No. 185 Warren street, Boston, Mass.
- Linden, Hugo F., Superior and Broad streets, Cleveland, Ohio.
- Lins, Albert H., No. 86 Second avenue, New York, N. Y.
- Little, James, Harrisonburg, Va.
- Livingston, Barent V. B., No. 306 Broadway, Brooklyn, N. Y.
- Llewellyn, John F., west side Public Square, Mexico, Adrian county, Mo.

- Lloyd, John U., cor. Court and Plum streets, Cincinnati, O.
- Lockhart, George B., cor. Thirty-second and O streets, West Washington, D. C.
- Lockwood, Samuel A., cor. Broad and White streets, Red Bank, Monmouth county, N. J.
- Lohman, George H., No. 1 Mitchell's Block, Kendallville, Ind.
- Loomis, John C., cor. Chestnut and Wall streets, Jeffersonville, Ind.
- Lord, Thomas, No. 72 Wabash avenue, Chicago, Ill.
- Love, Charles E., No. 544 Main street, Kansas City, Mo.
- Loveland, William F., No. 213 Bread street, Elizabeth, N. J.
- Lowd, John C., No. 43 Temple street, Boston, Mass.
- Lowden, John, No. 18 De Breseles street, Toronto, Can.
- Luce, Edgar H., No. 61 Warren street, Boston, Mass.
- Ludlow, Charles, No. 55 East Main street, Springfield, O.
- Luhn, Gustavus J., P. O. Box 582, Charleston, S. C.
- Lull, George E., Manchester, N. H.
- Luscomb, Will E., No. 310 Essex street, Salem, Mass.
- Lyman, Asahel H., No. 101 West River street, Manistee, Mich.
- Lynn, Winfield S., Indianapolis, Ind.
- Lyons, Isaac L., Nos. 42 and 44 Camp street, New Orleans, La.
- McCaffrey, James, No. 274 Main street, Cambridge City, Wayne county, O.
- McClure, Archibald, Nos. 74 and 76 State street, Albany, N. Y.
- McClure, William H., Nos. 74 and 76 State street, Albany, N. Y.
- McCollough, Winfield S., No. 1346 Jacob street, Wheeling, W. Va.
- McConville, Thomas A., Macon, Ga.*
- McDonald, George, Main and Burdick streets, Kalamazoo, Mich.
- McElhenie, Thomas D., No. 259 Ryerson street, Brooklyn, N. Y.
- McIntyre, Byron F., No. 99 North Moore street, New York, N. Y.
- McIntyre, Ewen, No. 874 Broadway, New York, N. Y.
- McIntyre, William, No. 2229 Frankford avenue, Philadelphia, Pa.
- McKelway, George J., No. 1410 Chestnut street, Philadelphia, Pa.
- McKenney, Jesse F., Shelbyville, Ky.
- McKesson, John, Jr., No. 91 Fulton street, New York, N. Y.
- McLeod, Roderick, Quebec, Can.
- McLelland, Robert C., Main street, Bryan, Tex.
- McNeil, John M., Broadway, Scottdale, Westmoreland county, Pa.
- McPherson, George, Chicago, Ill.
- Macdonald, Daniel T., Calumet, Haughton county, Mich.
- Mack, Adolph, No. 11 Front street, San Francisco, Cal.
- MacKimmie, George D., Detroit, Mich.
- MacLagan, Henry, No. 91 Fulton street, New York, N. Y.
- Macmahan, Thomas J., No. 142 Sixth avenue, New York, N. Y.
- Main, Thomas F., No. 278 Greenwich street, New York, N. Y.
- MAISCH, JOHN M., No. 143 North Tenth street, Philadelphia, Pa.
- Major, John R., No. 800 Seventh street, Washington, D. C.
- Major, Oscar, Clinton, Ia.
- Mallinckrodt, Edward, cor. Mallinckrodt and Main streets, St. Louis, Mo.
- Mangold, Gustavus A., No. 4 East State street, Trenton, N. J.
- Markoe, George F. H., cor. Warren and Dudley Streets, Boston, Mass.
- Marquardt, Jacob F., No. 60 Washington street, Tiffin, O.
- Marshall, Ernest C., No. 51 Vine street, Charlestown, Mass.
- Marsteller, George L., No. 231 King street, Charleston, S. C.
- Martin, Charles C., Lewisport, Ky.
- Martin, Emil, Russell avenue and South Meridian street, Indianapolis, Ind.
- Martin, Hugo W. C., Chicago, Ill.
- Martin, John C., U. S. Naval Dispensary, Washington, D. C.
- Martin, William J., Cincinnati, O.
- Masi, Frederick H., Main and Granby streets, Norfolk, Va.
- Mason, Alfred H., 41 St. John Baptiste street, Montreal, Canada.

- Mason, Norman N., No. 129 North Main street, Providence, R. I.
- Masters, Robert S., Main street, Kentville, Nova Scotia.
- Mattison, Richard V., No. 332 North Front street, Philadelphia, Pa.
- May, Arthur F., Cleveland, O.
- Mayell, Alfred, cor. Euclid avenue and Erie street, Cleveland, O.
- Maynard, Henry S., No. 626 West Lake street, Chicago, Ill.
- Mehringer, Joseph A., Jasper, Indiana.
- Meininger, Albert, cor. Vine and Twelfth streets, Cincinnati, O.
- Melchers, Henry, cor. Genesee and Jefferson streets, East Saginaw, Mich.
- Mellon, John J., No. 42 Camp street, New Orleans, La.
- Mellor, Alfred*, No. 218 North Twenty-second street, Philadelphia, Pa.
- Melvin, J. Lacy, Main and Pearl streets, Westville, Conn.
- Melvin, James S.*, No. 43 Temple Place, Boston, Mass.
- Menard, Robert P., Hot Springs, Ark.
- Menkemeller, Charles, cor. Twenty-second and Market streets, Wheeling, W. Va.
- Menninger, Henry J., No. 97 Sands street, Brooklyn, N. Y.
- Merrell, Ashbel H., Warsaw pike, Cincinnati, O.
- Merrell, George, No. 5 West Fifth street, Cincinnati, O.
- MERRILL, CHARLES A., No. 52 Water street, Exeter, N. H.
- Metcalf, Theodore*, No. 29 Tremont street, Boston, Mass.
- Metzner, Adolph, No. 94 East Washington street, Indianapolis, Ind.
- Meyer, Christian F. G., No. 8 North Second street, St. Louis, Mo.
- Meyers, Edward T., No. 16 Main street, Bethlehem, Pa.
- Meyers, James A., Odd Fellows' Hall, Columbia, Pa.
- Michaelis, Charles O., cor. King and Cannon streets, Charleston, S. C.
- Michaelis, Gustavus, No. 1 Myrtle avenue, Albany, N. Y.
- Milburn, John A., No. 1429 Pennsylvania avenue, N. W., Washington, D. C.
- Milburn, Washington C., No. 1429 Pennsylvanias avenue, N. W., Washington, D. C.
- Milhan, Edward L., No. 183 Broadway, New York, N. Y.
- Miller, Adolphus W., cor. Third and Callowhill streets, Philadelphia, Pa.
- Miller, Charles E., cor. Illinois and Market streets, Indianapolis, Ind.
- Miller, Frederick C., cor. Clay and Market streets, Louisville, Ky.
- Miller, George Y., No. 2 River street, Luzerne, Warren county, N. Y.
- Miller, Jacob A., cor. Second and Chestnut streets, Harrisburg, Pa.
- Miller, Jason A., Gloversville, N. Y.
- Miller, Robert McCleverty, Malone, N. Y.
- Milligan, Decatur, No. 509 North Second street, Philadelphia, Pa.
- Milliner, William T., Union street, Spencerport, N. Y.
- Miner, Maurice A., Wisconsin street, Geneva, Wis.
- Mingay, James, No. 472 Broadway, Saratoga Springs, N. Y.
- Miville, Frances C., No. 1023 Elm street, Manchester, N. H.
- Moffit, Thomas S.*, No. 322 Clay street, San Francisco, Cal.
- Mohr, Charles, No. 177 Dauphin street, Mobile, Ala.
- Moith, Augustus T.*, No. 1 Ferry street, Fishkill, N. Y.
- Molwitz, Ernest*, No. 966 Sixth avenue, New York, N. Y.
- Monsarrat, Oscar, No. 113 South Broadway, Baltimore, Md.
- Montgomery, Melvin, Silver Creek, Chautauqua county, N. Y.
- Moody, Richard H., Main and High streets, Belfast, Maine.
- Moore, George, No. 26 Market street, Somersworth, N. H.
- Moore, J. Faris*, Howard and Madison streets, Baltimore, Md.
- Moore, James P., No. 62 Lake street, Chicago, Ill.
- Moore, James S., West Stockbridge, Mass.
- Moore, Joachim B., Thirteenth and Lombard streets, Philadelphia, Pa.
- Moore, Silas H., No. 80 Fourth street, Sioux City, Iowa.
- Moore, Thomas F., Mobile, Ala.

- More, Arthur J., Sioux City, Iowa.
- Moorhead, William W., cor. Broad and South streets, Philadelphia, Pa.
- Morgan, Benjamin G., Main and Jackson streets, Hyde Park, Pa.
- Morgan, James*, Carl Junction, Mo.
- Morgan, Richard E., No. 135 High street, Holyoke, Mass.
- Morley, William J., No. 207 East Pecan street, Austin, Texas.
- Morrell, Mary H., Winterport, Me.
- Morrill, Benjamin, Blue Hill, Me.
- Morris, Lemuel I., Chemical Works, Bermuda street, Frankford, Philadelphia, Pa.
- Morrison, Thomas O., No. 262 Eighth avenue, New York, N. Y.
- Mott, George F., Catskill, Greene county, N. Y.
- Mowry, Alfred D., No. 365 Warren street, Boston, Mass.
- Mueller, Adolphus, Cherry street, Highland, Ill.
- Mueller, Louis H., No. 249 East Washington street, Indianapolis, Ind.
- Munds, James C., No. 104 North Front street, Wilmington, N. C.
- Munger, John F., No. 361 Broadway, East Greenbush, Rensselaer county, N. Y.
- Munson, Luzerne J., Apothecaries' Hall, Waterbury, Conn.
- Murray, Bernard J., No. 3356 Ridge avenue, Philadelphia, Pa.
- Murray, Francis M., Bluffton, Allen co., O.
- Murray, Talbot C., No. 513 Second street, N. W., Washington, D. C.
- Musler, Abram, Main street, Orange, N. J.
- Muth, John P., Nos. 14 and 16 German street, Baltimore, Md.
- Myers, Daniel, Cleveland, O.
- Nagle, Asher C., No. 266 West Federal street, Youngstown, O.
- Nattans, Arthur, cor. Second and D streets, N. W., Washington, D. C.
- Neergaard, Sidney H., No. 1183 Broadway, New York, N. Y.
- Newbold, Thomas M., No. 4160 Chestnut street, Philadelphia, Pa.
- Newman, Alcan E., Hot Springs, Ark.
- Newman, George A., cor. Fifth and Walnut streets, Louisville, Ky.
- Newman, George A.*, No. 380 Myrtle avenue, Brooklyn, N. Y.
- Nicholas, William C., Main and Centre streets, Orange, N. J.
- Nichols, Edward P., Killingworth, Conn.
- Nichols, Thomas B., No. 159½ Essex street, Salem, Mass.
- Nick, Frederick, No. 1726 Peach street, Erie, Pa.
- Nicot, Louis E., No. 65 Union avenue, Brooklyn, N. Y.
- Niebrugge, John A.*, No. 506 Bedford avenue, Brooklyn, N. Y.
- Nienstaedt, Hermann, Minnesota Soap Co., Minneapolis, Minn.
- Nipgen, John A., Chillicothe, O.
- Nisbet, William W., Washington avenue, Pittsburg, Pa.
- Noble, John J., Centre and Pelham streets, Newton Centre, Mass.
- Noyes, Daniel R., St. Paul, Minn.
- Oatman, Le Roy S., No. 5 Commercial street, Angola, Erie county, N. Y.
- Oberdeener, Moses, Santa Clara, Cal.
- O'Brien, James J., No. 53 Kneeland street, Boston, Mass.
- O'Neil, Henry M., No. 463 Hudson street, New York, N. Y.
- Ohliger, Lewis P., No. 23 West Liberty street, Wooster, O.
- Oldberg, Oscar, No. 465 State street, Chicago, Ill.
- Oleson, Olaf M., Market street, Fort Dodge, Ia.
- Oliver, William M., No. 132 Broad street, Elizabeth, N. J.
- Ollif, James H.*, No. 855 Fulton street, Brooklyn, N. Y.
- Orne, Charles P., No. 493 Main street, Cambridgeport, Mass.
- Orne, Joel S., No. 493 Main street, Cambridgeport, Mass.
- Osann, Bernard, No. 107 Fourth avenue, New York, N. Y.
- Osgood, Hugh H., No. 148 Main street, Norwich, Conn.
- Osman, Charles A., No. 13 Seventh avenue, New York, N. Y.
- Ottinger, James J., Twentieth and Spruce streets, Philadelphia, Pa.
- Otto, Charles H., No. 137 Prince street, New York, N. Y.
- Owens, James A., No. 45 Dominick street, Rome, N. Y.

- Owens, Richard J., cor. Myrtle and Spencer streets, Brooklyn, N. Y.
- Oxley, Jefferson, Nicholasville, Ky.
- Paine, James D.*, No. 18 Buffalo street, Rochester, N. Y.
- Paine, Milton K., cor. Main and State streets, Windsor, Vt.
- Painter, Emlen, Sixth avenue and Thirty-fourth street, New York, N. Y.
- Panknin, Charles F., No. 123 Meeting street, Charleston, S. C.
- Parcher, George A., Main street, Ellsworth, Me.
- Parker, George H., Draper's Block, Main street, Andover, Mass.
- Parr, John C.*, Main street, Weston, Mo.
- Parrish, Clemmons, No. 72 Henry street, Brooklyn, N. Y.
- Parrish, Dillwyn*, No. 1017 Cherry street, Philadelphia, Pa.
- Parsons, Henry B., No. 170 William street, New York, N. Y.
- Parsons, John, No. 684 Wabash avenue, Chicago, Ill.
- Parsons, Richard, No. 182 Ontario street, Cleveland, O.
- Parsons, Robert E., No. 19 Main street, Orange, N. J.
- Partridge, Charles K., Granite Block, Augusta, Me.
- Patch, Edgar L., No. 90 Green street, Boston, Mass.
- Patten, I. Bartlett*, No. 39 Harrison street, Boston, Mass.
- Patton, John Franklin, York, Pa.
- Patterson, James L., cor. Twenty-first street and Ridge avenue, Philadelphia, Pa.
- Patterson, Theodore H., 3644 Cottage Grove, Chicago, Ill.
- Pauley, Frank C., cor. Eastern street and Compton avenue, St. Louis, Mo.
- Peabody, William H.*, No. 8 South Division street, Buffalo, N. Y.
- Pearce, James H., No. 19 Front street, W., Toronto, Can.
- Pease, Francis M., Lee, Mass.
- Peck, George L., Jamaica, N. Y.
- Peixotto, Moses L. M., No. 543 Fifth avenue, New York, N. Y.
- Penfold, Henry J., No. 5 Commercial street, Angola, Erie county, N. Y.
- Pennington, T. H. Sands, No. 400 Broadway, Saratoga, N. Y.
- Penrose, Stephen F., S. E. cor. Main and Broad streets, Quakertown, Pa.
- Perkins, Benjamin A., Nos. 74 and 76 Commercial street, Portland, Me.
- Perkins, Elisha H.*, cor. Green and Baltimore streets, Baltimore, Md.
- Perkins, William A., No. 84 South C street, Virginia City, Nev.
- Perot, T. Morris*, No. 1810 Pine street, Philadelphia, Pa.
- Perry, Bayard T., No. 1088 Elm street, Manchester, N. H.
- Pettingill, Edward T., G and Twenty-first streets, N. W., Washington, D. C.
- Pettit, Henry M., Carrollton, Mo.
- Pettit, Louis C., Bismarck, Dak. T.
- Pfingst, Edward C., cor. Third and Breckenridge streets, Louisville, Ky.
- PFINGST, FERDINAND J., cor. Eleventh and Market streets, Louisville, Ky.
- Pfingst, Henry A., cor. Eleventh and Market streets, Louisville, Ky.
- Pfingsten, Gustavus, No. 6 Whitehall street, New York, N. Y.
- Phelps, Dwight, 337 Main street, West Winsted, Conn.
- Phillips, Charles W., No. 484 Eastern avenue, Cincinnati, O.
- Phillips, Walter F.*, Nos. 134, 136, and 138 Middle street, Portland, Me.
- Physic, Henry S., No. 905 Clay avenue, St. Louis, Mo.
- Pierce, Frank W., Main street, Chester, Vt.
- Pierce, William H., No. 2147 Washington street, Boston, Mass.
- Pile, Gustavus, No. 770 Passyunk avenue, Philadelphia, Pa.
- Pilsbury, Frank O., Walpole, Mass.
- Pinkham, Alonzo T., Franklin Square, Dover, N. H.
- Pitt, John R., Jr., No. 218 Main street, Middletown, Conn.
- Plautz, C. Herman, No. 709 Milwaukee avenue, Chicago, Ill.
- Plummer, David G., No. 6 Main street, Bradford, Stark county, Ill.
- Plummer, Edwin M., Sterling, Rice co., Kan.
- Plummer, William P., Bradford, Stark county, Ill.
- Poley, Francis H., Norristown, Pa.

- Pollard, Frank W., Hot Springs, Ark.
 Porter, Chiton S., Eminence, Ky.
 Porter, Henry C., cor. Main and Pine streets, Towanda, Pa.
 Porter, W. C. Greensboro, N. C.
 Post, Elisha, cor. Main and Pine streets, Athens, N. Y.
 Potterfield, Clarence A., Charleston, Kanawha county, W. Va.
 Powell, Robert B., Eureka, Humboldt Bay, Cal.
 Powell, Thomas W., No. 10 Houston street, Fort Worth, Tex.
 Powell, William R., No. 91 Fulton street, New York, N. Y.
 Power, Frederick B., University of Wisconsin, Madison, Wis.
 Prall, Delbert E., 111 Jefferson avenue, East Saginaw, Mich.
 Prentice, Frederick F., opposite Post Office, Janesville, Wis.
 Prescott, Albert B., University of Michigan, Ann Arbor, Mich.
 Prescott, Horace A., No. 307 Washington street, Boston, Mass.
 Preston, Andrew P., State street, Portsmouth, N. H.
 Preston, Calvin W., No. 175 Market street, Galveston, Tex.
 Preston, David, cor. Ninth and Lombard streets, Philadelphia, Pa.
 Preuss, Edward A., No. 21 Spring street, Los Angeles, Cal.
 Price, Charles H., Salem, Mass.
 Priddy, Robert S., No. 19 Sandwich street, Windsor, Ontario, Canada.
 Prieson, Adolph, Main and Desper streets, Lock Haven, Pa.
 Procter, Wallace, cor. Ninth and Lombard streets, Philadelphia, Pa.
 Punch, William F., No. 71 Dauphin street, Mobile, Ala.
 Purcell, John B., No. 1216 East Main street, Richmond, Va.
 Pursell, Howard, S. W. cor. Mill and Cedar streets, Bristol, Pa.
 Pyle, Cyrus, No. 326 Fulton street, Brooklyn, N. Y.
 Rackley, Benjamin F., Franklin Square and Charles street, Dover, N. H.
 Rademaker, Herman H., cor. Madison and Shelby streets, Louisville, Ky.
 Ramsperger, Gustavus, No. 703 Fulton street, Brooklyn, N. Y.
 Randall, George D., Railroad street, St. Johnsbury, Vt.
 Rankin, Jesse W., Decatur and Pryor streets, Atlanta, Ga.
 Rano, Charles O., No. 1872 Niagara street, Buffalo, N. Y.
 Rapelye, Charles A., No. 605 Main street, Hartford, Conn.
 Raser, John B., No. 164 North Eighth street, Reading, Pa.
 Redsecker, Jacob H., Lebanon, Pa.
 Reed, Isaac N., No. 139 Summit street, Toledo, O.
 Reichardt, F. Alfred, No. 45 Maiden Lane, New York, N. Y.
 Reinhold, William, No. 146 North Clark street, Chicago, Ill.
 Reinlein, Paul, Washington, D. C.
 Reiss, Edward C., No. 170 William street, New York, N. Y.
 REMINGTON, JOSEPH P., cor. Thirteenth and Walnut streets, Philadelphia, Pa.
 Rendigs, Charles P., cor. Spring and Abigail streets, Cincinnati, O.
 Renouff, James T., Main street, Winsted, Conn.
 Renz, Fred. J., cor. Market and Floyd streets, Louisville, Ky.
 Restieaux, Thomas, No. 29 Tremont street, Boston, Mass.
 Reule, John, Lafayette, Ind.
 Reum, Hermann F., cor. Fifth and Broadway, Cincinnati, O.
 Reusch, Ernst, No. 164 Nevin street, Brooklyn, N. Y.
 Reynolds, Charles E., U. S. Receiving Ship Colorado, Brooklyn, N. Y.
 Reynolds, Howard P., cor. Front and Cherry streets, Plainfield, N. J.
 Reynolds, John J., Flemingsburg, Ky.
 Reynolds, William K., No. 254 Friendship street, Providence, R. I.
 Rhoades, Stephen H., No. 88 Main street, Pittston, Pa.
 Rice, Charles, Bellevue Hospital, N. Y.
 Rich, Willis S., Sand Bank, N. Y.
 Richardson, James, No. 2827 Locust street, St. Louis, Mo.
 Richardson, J. Clifford, No. 704 North Main street, St. Louis, Mo.

- Ricksecker, Theodore, No. 146 William street, New York, N. Y.
- Rickey, Randal, No. 157 North Green street, Trenton, N. J.
- Riddell, James A., Aurora, Ind.
- Ridgway, Lemuel A., Mansfield, Tioga county, Pa.
- Rieffenstahl, Julius, Buffalo, N. Y.
- Riesenman, Joseph, Liberty street, Franklin, Pa.
- Riley, Charles W., No. 1115 Race street, Philadelphia, Pa.
- Risk, Clarence H., Charles and Read streets, Baltimore, Md.
- Rittenhouse, Henry N.*, No. 218 North Twenty-second street, Philadelphia, Pa.
- Robbins, Alonzo, cor. Eleventh and Vine streets, Philadelphia, Pa.
- Robbins, Charles A., No. 91 Fulton street, New York, N. Y.
- Robbins, Daniel C., No. 91 Fulton street, New York, N. Y.
- Roberts, Daniel J., Peabody, Kan.
- Roberts, Joseph*, cor. Harford and Greenmount avenues, Baltimore, Md.
- Robertson, Archibald C., Allegheny City, Pa.
- Robinson, Frederick, Kenosha, Wis.
- Robinson, James S., cor. Second and Madison streets, Memphis, Tenn.
- Robinson, William S., Yorkville, Toronto, Ont., Can.
- Roche, Edward M., No. 611 South Fifteenth street, Philadelphia, Pa.
- Rockefeller, Lucius, Palisade avenue, Englewood, N. J.
- Rogers, Arthur H., Geneseo, N. Y.
- Rogers, Wiley, cor. Fifteenth and Chestnut streets, Louisville, Ky.
- Rogers, William H., North street, Middletown, N. Y.
- Rollins, John F.*, Fort George, Fla.
- Rolph, Charles W., Castile, Wyoming county, N. Y.
- Rommel, Emanuel, Lockport, N. Y.
- Ronnefeld, Theodore, No. 195 Gratiot street, Detroit, Mich.
- Rose, Henry J., cor. Yonge and Queen streets, Toronto, Ont., Can.
- Rosengarten, Mitchell G., cor. Seventeenth and Fitzwater streets, Philadelphia, Pa.
- Rosenwasser, Nathan, No. 112 Superior street, Cleveland, O.
- Ross, Ellison H., Adrian, Mich.
- Roth, Eugene N., Market street, between Green and St. Louis streets, Thibodeaux, La.
- Royce, Lucien M., No. 278 Greenwich street, New York, N. Y.
- Ruble, John B., Canton, Ill.
- Ruete, Theodore W., No. 379 Main street, Dubuque, Iowa.
- Rumsey, Samuel L., No. 423 Main street, East Orange, N. J.
- Runyon, Edward W., No. 529 Market street, San Francisco, Cal.
- Ruppert, John, Cincinnati, O.
- Russell, Edward W., cor. Baltimore and Eutaw streets, Baltimore, Md.
- Russell, Elias S., No. 69 Main street, Nashua, N. H.
- Russell, Eugene J.*, cor. Army street and Canton avenue, Baltimore, Md.
- Rust, William, No. 7 Peace street, New Brunswick, N. J.
- Ryerson, Henry O., Newton, N. J.
- Safford, William B., cor. Vance and Hernando streets, Memphis, Tenn.
- Sander, Enno, cor. Nineteenth and South Eleventh streets, St. Louis, Mo.
- Sanderson, Stephen Francis, Rochester, N. Y.
- Sands, George G., No. 4 Vanderbilt avenue, New York, N. Y.
- Sappington, Richard, No. 131 North Gay street, Baltimore, Md.
- Sargent, Ezekiel H., No. 125 State street, Chicago, Ill.
- Sauer, Louis W., Central avenue and Baymiller street, Cincinnati, O.
- Sauerhering, R., Main street, Mayville, Dodge county, Wis.
- Saunders, Richard B.*, Chapel Hill, N. C.
- Saunders, William, London, Ontario, Can.
- Sautter, Louis, cor. South Pearl and Plain streets, Albany, N. Y.
- Savage, Thomas J., Mobile, Ala.
- Sayre, Edward A., No. 461 Myrtle avenue, Brooklyn, N. Y.
- Sayre, Lucius E., 1800 Market street, Philadelphia, Pa.
- Sayre, William H., cor. Warner and Orange streets, Newark, N. J.
- Scala, William Franklin, No. 50 East Capitol street, Washington, D. C.

- Schaaf, Justus H., cor. Second and Pine streets, Gallipolis, O.
- Schafer, George H., No. 129 Front street, Fort Madison, Iowa.
- Schaffle, Samuel W. W., Market street, Lewisburg, Pa.
- Schafhirt, Adolph J., cor. First and M streets, Washington, D. C.
- Schambs, George M., No. 104 Huntington street, Cleveland, O.
- Scheffer, Emil, No. 145 Market street, Louisville, Ky.
- Scheffer, Henry W., No. 218 Clark avenue, St. Louis, Mo.
- Schellentrager, E. A., No. 717 St. Clair street, Cleveland, O.
- Scherer, Andrew, 381 East Division street, Chicago, Ill.
- Scherff, John P., Glenwood avenue and Washington street, Bloomfield, N. J.
- Scherling, Gustav, 401 Fourth street, Sioux City, Ia.
- Schermerhorn, Winfield S., Main street, Stillwater, Saratoga county, N. Y.
- Schiemann, Edward B., cor. M. and Walnut streets, Louisville, Ky.
- Schlaepfer, Henry J., cor. Main and Second streets, Evansville, Ind.
- Schley, Steiner, No. 16 West Patrick street, Frederick City, Md.
- Schmidt, Florian C., Fulton avenue and Franklin street, Evansville, Ind.
- Schmitt, Joseph M., No. 108 North avenue, Rochester, N. Y.
- Schneider, Matthias M., No. 327 Carson street, Pittsburgh, Pa.
- Schoettlin, Albert J., No. 301 West Broadway, Louisville, Ky.
- Scholtz, Edmund L., Denver, Col.
- Schrader, Henry, No. 74 East Washington street, Indianapolis, Ind.
- Schranck, Henry C., Nos. 437 and 439 East Water street, Milwaukee, Wis.
- Schreck, Leo S., 114 John St, Cincinnati, O.
- Schreiber, August, Odd Fellows' Hall, Eighth street, Tell City, Ind.
- Schroder, Hermann, No. 525 Main street, Quincy, Ill.
- Schueller, Ernst, No. 231 South High street, Columbus, O.
- Schueller, Frederick W., Nos. 190 and 192 South High street, Columbus, O.
- Schuerman, Frederick, Cincinnati, O.
- Schumann, Peter J., Whitehall and Hunter streets, Atlanta, Ga.
- Schumann, Theodore, cor. Whitehall and Hunter streets, Atlanta, Ga.
- Schwartz, John C., Hamilton, O.
- Schofield, James S., Ninth avenue and Fifty-seventh street, New York, N. Y.
- Scott, Geo. T., Worcester, Mass.
- Scott, Nelson R., cor. Main and Southbridge streets, Worcester, Mass.
- Scott, William H., No. 1617 Seventeenth street, Richmond, Va.
- Scott, William J., No. 257 Prospect street, Cleveland, O.
- Scoville, Charles H., 3 South Canal street, Tonawanda, Erie county, N. Y.
- Seabury, George J., No. 21 Platt street, New York, N. Y.
- Searby, William M., No. 859 Market street, San Francisco, Cal.
- Sechler, James C., No. 201 Mill street, Danville, Pa.
- Sedberry, Bond E., Fayetteville, N. C.
- Seitz, Oscar, Salina, Kan.
- Senior, Frederick S., No. 1164 Humboldt avenue, Milwaukee, Wis.
- Sennewald, Ferdinand W., No. 800 Hickory street, St. Louis, Mo.
- Serodino, Herman, Cincinnati, O.
- Sevin, N. Douglas, No. 141 Main street, Norwich, Conn.
- Sewald, David J., Dorchester avenue and Adam street, Boston, Mass.
- Sharp, Alpheus P., cor. Pratt and Howard streets, Baltimore, Md.
- Sharples, Stephen P., No. 114 State street, Boston, Mass.
- Shaw, Robert J., No. 3 East Front street, Plainfield, N. J.
- Shed, Edward E., No. 8 Water street, Eastport, Me.
- Shearer, Edward Y., No. 1103 Second avenue, New York, N. Y.
- Shedd, Edwin W., No. 61 Warren street, Boston, Mass.
- Shedden, John W., No. 1275 Broadway, New York, N. Y.
- Sheils, George E., No. 896 Broadway, New York, N. Y.
- SHEPPARD, SAMUEL A. D., No. 1129 Washington street, Boston, Mass.

- Sherwood, Hezekiah S., No. 459 Main street, Poughkeepsie, N. Y.
- Sherwood, Louis W., No. 31 West Broad street, Columbus, O.
- Shinn, James T., cor. Broad and Spruce streets, Philadelphia, Pa.
- Shivers, Charles, cor. Seventh and Spruce streets, Philadelphia, Pa.
- Shoemaker, Richard M., cor. Fourth and Race streets, Philadelphia, Pa.
- Short, J. Eagan, U. S. Naval Dispensary, Washington, D. C.
- Shrader, John L., Market street, Wappinger's Falls, N. Y.
- Shreve, John A., Port Gibson, Miss.
- Shriver, Henry, No. 53 Baltimore street, Cumberland, Md.
- Shryer, Thomas W., No. 103 Baltimore street, Cumberland, Md.
- Shryock, Allen, No. 1129 Mount Vernon street, Philadelphia, Pa.
- Shurtleff, Israel A., No. 39 Elm street, New Bedford, Mass.
- Siegemund, Charles A., No. 1553 Washington street, Boston, Mass.
- Siegenthaler, Harvey N., No. 55 East Main street, Springfield, O.
- Simmons, Karl, St. Paul, Minn.
- Simms, Giles G. C., No. 1344 New York avenue, Washington, D. C.
- Simpson, William, No. 33 Fayetteville street, Raleigh, N. C.
- Simpson, William, No. 609 Davis street, San Francisco, Cal.
- Simson, Francis C., care of Brown & Webb, Halifax, N. S.
- Simpers, J. Wilmer, cor. Thirteenth street and Columbia avenue, Philadelphia, Pa.
- Sitton, Charles E., No. 151 First street, Portland, Oregon.
- Skelly, James T., No. 339 East Fourteenth street, New York, N. Y.
- Slater, Frank H., Main street, Mattawan, Monmouth county, N. J.
- Sloan, George W., Nos. 7 and 9 East Washington street, Indianapolis, Ind.
- Slocum, Frank L., 4545 Paul street, Frankford, Philadelphia.
- Slosson, Frank W., No. 223 Superior street, Cleveland, O.
- Slosson, George, Coffeyville, Kan.
- Smalley, Elijah, No. 271 Harrison avenue, Boston, Mass.
- Smith, Charles B., No. 861 Broad street, Newark, N. J.
- Smith, Israel P., No. 324 Bank street, Newark, N. J.
- Smith, J. Hungerford, Au Sable Forks, N. Y.
- Smith, Joseph S., No. 193 S. Howard street, Akron, O.
- Smith, Linton, cor. Seventh and Market streets, Wilmington, Del.
- Smith, S. Douglas, 526 Penn street, Reading, Pa.
- Smith, Willard, Rochester, N. Y.
- Smith, Willard A., Main street, Richfield Springs, N. Y.
- Smithnight, Albert, No. 135 Woodland avenue, Cleveland, O.
- Sniteman, Charles C., Neillsville, Wis.
- Snively, Andrew J., Centre Square, Hanover, York county, Pa.
- Snow, Charles W., No. 28 East Genesee street, Syracuse, N. Y.
- Snow, Jesse W., No. 23 Charles street, Boston, Mass.
- Snyder, Alva L., 33 Court Square, Bryan, O.
- Snyder, Ambrose C.*, cor. Court and Atlantic avenue, Brooklyn, N. Y.
- Sombart, John E., Boonville, Mo.
- Somers, Frank G., No. 125 State street, Chicago, Ill.
- Somers, Richard M., Seventeenth and Oxford streets, Philadelphia, Pa.
- Spalding, Warren A., No. 19 Church street, New Haven, Conn.
- Spannagel, Charles C., No. 1607 Ridge avenue, Philadelphia, Pa.
- Spencer, Peter I., No. 88 Garden street, Cleveland, O.
- Sperry, Herman J., No. 151 Chapel street, New Haven, Conn.
- Spieth, William F., No. 273 Woodland avenue, Cleveland, O.
- Spofford, Charles B., North Main street, Newport, N. H.
- Springer, William T., Louisville, Ky.
- Squibb, Edward H., No. 36 Doughty street, Brooklyn, N. Y.
- Squibb, Edward R., No. 36 Doughty street, Brooklyn, N. Y.

- Stacey, Benjamin F., No. 51 Vine street, Charlestown, Mass.
- Stahler, William, S. E. cor. Main and Swede streets, Norristown, Pa.
- Staley, Michael S., Indianapolis, Ind.
- Stam, Colin A., Chestertown, Md.
- Stamford, William H., No. 256 Mulberry street, Newark, N. J.
- Standford, William A., Florence, Kan.
- Stanford, James W., Cuthbert, Ga.
- Stanley, E. C., No. 6 Beach avenue, Auburn, N. Y.
- Starr, Thomas, No. 313 Ninth avenue, New York, N. Y.
- Steele, Henry*, N. E. cor. Turk and Taylor streets, San Francisco, Cal.
- Steele, James G., No. 316 Kearney street, San Francisco, Cal.
- Stein, Jacob H., No. 803 Penn street, Reading, Pa.
- Steinhauer, Frederick, Denver, Col.
- Stevens, Luther F., Atlantic avenue cor. Court street, Brooklyn, N. Y.
- Stewart, Francis E., 721 South Twenty-second street, Philadelphia, Pa.
- Stierle, Adolph, No. 302 East Seventh street, St. Paul, Minn.
- Stone, Clarence G., 580 Lafayette avenue, Detroit, Mich.
- Stowell, Daniel, No. 1045 Washington street, Boston, Mass.
- Strachan, William E., No. 619 Third avenue, Brooklyn, N. Y.
- Strassel, William, cor. Shelby and Broadway, Louisville, Ky.
- Stuart, Ennere B., Peoria, Ill.
- Sturtevant, T. Frank, Wyandotte, Kan.
- Sutton, Peter P., cor. Floyd and Market streets, Louisville, Ky.
- Sweeny, Robert O.*, St. Paul, Minn.
- Sweet, Abel S., Jr., No. 2 Main street, Bangor, Me.
- Sweet, Caldwell, Bangor, Me.
- Sweet, Frederick K., No. 2 Main street, Lockport, N. Y.
- Sweet, William S., Pike, N. Y.
- Tartis, Alfred J., No. 268 Putnam avenue, Brooklyn, N. Y.
- Taylor, Alfred B.*, No. 31 South Eleventh street, Philadelphia, Pa.
- Taylor, James H., No. 104 Thames street, Newport, R. I.
- Taylor, John P., No. 99 Third street, New Bedford, Mass.
- Test, Alfred W., cor. Second and Federal streets, Camden, N. J.
- Thatcher, Joseph H., No. 12 Market street, Portsmouth, N. H.
- Thatcher, Hervey D., No. 12 Market Square, Potsdam, N. Y.
- Thibodeaux, Joseph G., Main street, Thibodeaux, La.
- Thackeray, William F., 1201 Arlington avenue, Davenport, Ia.
- Thomas, George M., Derry Station, Pa.
- Thomas, James, Jr., opposite Maxwell House, Nashville, Tenn.
- Thomas, Oscar E., No. 123 Richardson street, Columbia, S. C.
- Thompson, Ebenezer K., No. 8 Diamond street, Titusville, Pa.
- Thompson, Edward W., No. 181 Main street, New Britain, Conn.
- Thompson, William B.*, No. 1700 Mount Vernon street, Philadelphia, Pa.
- Thompson, William P., No. 5 West Baltimore street, Baltimore, Md.
- Thompson, William S., No. 705 Fifteenth street, Washington, D. C.
- Thompson, William S., No. 5 West Baltimore street, Baltimore, Md.
- Thomsen, John J., Nos. 14 and 16 German street, Baltimore, Md.
- Thomsen, John J., Jr., No. 18 McCulloh street, Baltimore, Md.
- Thomson, William M., No. 309 North Third street, Philadelphia, Pa.
- Thorn, Henry P., Medford, N. J.
- Thornton, William E., cor. Baltimore and Harrison streets, Baltimore, Md.
- Thorp, Abner, N. W. cor. Court and Plum streets, Cincinnati, O.
- Thurber, Almon R., No. 134 Main street, Ashtabula, O.
- Tiarks, Hermann, First street, Monticello, Iowa.
- Tibbs, William H., No. 235 Main street, Buffalo, N. Y.
- Tiernan, Frank M., Mansion House, Roselle, N. J.
- Tilyard, Charles S., cor. Green and Franklin streets, Baltimore, Md.
- Tindall, Graham McF., No. 61 Commercial street, Aberdeen, Miss.

- Tobey, Charles W., Troy, O.
- Tomfohrde, John W., cor. Benton and West Eighteenth streets, St. Louis, Mo.
- Tompkins, Orlando*, Boston Theatre, Boston, Mass.
- Tooker, William W., Sag Harbor, N. Y.
- Topley, James, No. 166 Georgia street, Vallejo, Solano county, Cal.
- Toulson, Melbourn A., Chestertown, Md.
- Tower, Levi, Jr., No. 1681 Washington street, Boston, Mass.
- Townley, William W., No. 765 Broad street, Newark, N. J.
- Townsend, Abram R., 10 West Main street, Marshalltown, Iowa.
- Trask, Charles M., White River Junction, Vt.
- Trimble, Henry, 145 North Tenth street, Philadelphia, Pa.
- Troth, Samuel F.*, No. 1019 Cherry street, Philadelphia, Pa.
- Troupe, Theodore, Springfield, O.
- Truax, Charles, Cedar Rapids, Linn county, Iowa.
- Tscheppe, Adolph, No. 1010 Third avenue, New York, N. Y.
- TUPTS, CHARLES A., No. 25 Washington street, Dover, N. H.
- Turner, George H., No. 296 South Pearl street, Albany, N. Y.
- Turner, Isaac W., No. 139 Wayne street, Jersey City, N. J.
- Turner, T. Larkin*, No. 390 Tremont street, Boston, Mass.
- Tuska, David, Second avenue and Eighty-sixth street, New York, N. Y.
- Twombly, John H., Masonic Block, Main street, Newmarket, N. H.
- Tyson, Samuel E.*, No. 141 West street, Georgetown, D. C.
- Ubert, Julius C., cor. Lee and Division streets, Brooklyn, N. Y.
- Ude, George, 3610 N. Tenth St., St. Louis, Mo.
- Uhlich, Ferdinand G., No. 1401 Salisbury street, St. Louis, Mo.
- Underhill, George F., cor. Main and School streets, Concord, N. H.
- Underhill, Joseph G., No. 397 Classon avenue, Brooklyn, N. Y.
- Underwood, Charles G., cor. Lewis street and Maverick Square, Boston, Mass.
- Urban, Jacob P., No. 356 Ontario street, Cleveland, O.
- Van Alstyne, Franklin B., Kinderhook, N. Y.
- Van Antwerp, ~~Garcia~~, No. 71 Dauphin street, Mobile, Ala.
- Van Auken, Jerrie A., No. 125 Main street, Cloversville, N. Y.
- Vandergrift, John A., No. 69 High street, Burlington, N. J.
- Van der Emde, Reinhold, No. 323 Bowery, New York, N. Y.
- Vandervoord, Ramsford W., No. 482 Broad street, Newark, N. J.
- Van Patten, William J., College street, Burlington, Vt.
- Vansant, Robert H., Pitman avenue, Ocean Grove, N. J.
- Van Winkle, Abraham W., No. 35 Clinton avenue, Newark, N. J.
- Vaughan, P. W., Durham, Orange county, N. C.
- Vaupel, Charles P., Cleveland, O.
- Vernor, James*, No. 235 Woodward avenue, Detroit, Mich.
- Viallon, Paul L., Park and Front streets, Bayou Goula, La.
- Vickery, William H., cor. Central and Orchard streets, Dover, N. H.
- Vilter, Herman, McMicken avenue and Locust street, Cincinnati, O.
- Vincent, William, No. 117 Broadway, Brooklyn, E. D., N. Y.
- Vorick, August H., S. E. cor. Jefferson avenue and Benton street, St. Louis, Mo.
- Wackerbarth, John, cor. Sands and Bridge streets, Brooklyn, N. Y.
- Wagner, Henry, cor. Fourth and Elm streets, Cincinnati, O.
- Wahmhoff, Julius H., Delphos, O.
- Walbrach, Arthur, Denver, Col.
- Walker, Ansell, Freehold, N. J.
- Walker, Charles, Hannibal, Mo.
- Walker, Francis W., Jr., New Brighton, Pa.
- Walker, George, Girard, Kan.
- Walker, William J., No. 74 State street, Albany, N. Y.
- Wall, Otto A., 2111 Columbus street, St. Louis, Mo.
- Walsh, Robert H., No. 1412 Walnut street, Philadelphia, Pa.
- Walton, Harry C., Laurel and Cutter streets, Cincinnati, O.
- Walton, Joseph, Washington, D. C.

- Wangler, Conrad D., Eastside, Waterloo, Ia.
 Wanier, George S., No. 407 Eighth avenue,
 New York, N. Y.
Wardell, Robert C., Battle Creek, Mich.
 Warne, Henry L., Mitchell, Dak. Ter.
Warner, William R., No. 1228 Market
street, Philadelphia, Pa.
 Warren, Mrs. Ella F., Bellville, Richland
 county, O.
 Watjen, Herman J., Vincennes, Ind.
 Waugh, George J., Stratford, Ontario, Can-
 ada.
 Wayne, Edward S., No. 146 Broadway,
 Cincinnati, O.
 Weaver, Charles A., cor. Fifth and Walnut
 streets, Des Moines, Ia.
 Weaver, John A., Easton, Pa.
 Webb, John A., No. 210 Madison avenue,
 Baltimore, Md.
 Webb, William H., No. 556 North Six-
 teenth street, Philadelphia, Pa.
 Webber, Joseph T., cor. Main and State
 streets, Springfield, Mass.
 Weber, William, cor. Fifteenth and Thomp-
 son streets, Philadelphia, Pa.
 Webster, Stephen, No. 63 Warren avenue,
 Boston, Mass.
 Wehrly, Thomas M., No. 72 G street, N.
 W., Washington, D. C.
 Weichsel, Franz, No. 602 Pearl street,
 Cleveland, O.
 Weidemann, Charles A., No. 563 North
 Twenty-second street, Philadelphia, Pa.
 Weinman, Oscar C., No. 173 Seventh ave-
 nue, New York, N. Y.
 Weiser, Albert, cor. St. Paul and Main
 streets, St. Paul, Minn.
 Weiser, Emilius I., Decorah, Ia.
 Welch, Leonard E., cor. Broad and Wash-
 ington streets, Albany, Ga.
 Wellcome, Henry S., No. 8 Snow Hill,
 London, England.
 Wells, Ebenezer M., Houston street, Fort
 Worth, Texas.
 Wells, Jacob D., cor. Fourth street and
 Central avenue, Cincinnati, O.
 Wells, Romanta, No. 297 State street, New
 Haven, Conn.
 Wendell, Henry E., cor. Third and George
 streets, Philadelphia, Pa.
 Wenzell, William T., No. 852 Market
 street, San Francisco, Cal.
- West, Howell F., Main street, Fayette,
 Miss.
 Westmann, F. H., No. 2744 Cass avenue,
 St. Louis, Mo.
 Weusthoff, Otto S., No. 212 East Third
 street, Dayton, O.
 Whall, Joseph S., No. 82 Hancock street,
 Quincy, Mass.
 Wharton, John C., No. 38 Union street
 Nashville, Tenn.
 Wharton, William H., No. 38 Union street,
 Nashville, Tenn.
 Wheeler, C. Gilbert, No. 81 Clark street,
 Chicago, Ill.
 Wheeler, Leonard H., No. 78 State street,
 Albany, N. Y.
Wheeler, Lucien F., Waldo, Fla.
 WHITE, AARON S., No. 59, High street,
 Mount Holly, N. J.
 White, George H., cor. Newark and Jersey
 avenues, Jersey City, N. J.
 White, Philip A., No. 102 Gold street,
 New York, N. Y.
 WHITEFIELD, THOMAS, No. 240 Wabash
 avenue, Chicago, Ill.
 Whiting, Frederick T., Main street, Great
 Barrington, Mass.
 Whitman, Nelson S., No. 3 Merchant's
 Exchange, Nashua, N. H.
 Whitney, Henry M., cor. Essex and Law-
 rence streets, Lawrence, Mass.
 Wichelus, Frederick, Bowery and Fourth
 street, New York, N. Y.
 Wickham, William H., No. 91 Fulton
 street, New York, N. Y.
 Wiegand, Thomas S., No. 4 South Thirty-
 eighth street, Philadelphia, Pa.
 Wienges, Conrad, cor. Coles and Fourth
 streets, Jersey City, N. J.
 Wigert, Carl R., No. 213 Jefferson street,
 Burlington, Iowa.
 Wilcox, Frederick, Apothecaries' Hall,
 Exchange Place, Waterbury, Conn.
 Wilder, Graham, No. 181 Main street,
 Louisville, Ky.
 Wilder, Hans M., Philadelphia, Pa.
 Williams, Alfred N., 93 Market street, Par-
 kersburg, W. Va.
 Williams, Doane B., 16 Lincoln Square,
 Worcester, Mass.
 Willams, John K., No. 391 Main street,
 Hartford, Conn.

- Williams, Richard W., Notre Dame street,
Three Rivers, Quebec, Can.
- Williams, William H., No. 659 Main street,
Wheeling, W. Va.
- Williamson, Edward J., Ninth and Frank-
lin streets, St. Louis, Mo.
- Wilson, Albert H., Penn street and Franks-
town avenue, Pittsburg, Pa.
- Wilson, Benjamin O., No. 28 Merchants'
Row, Boston, Mass.
- Wilson, Frank M., No. 133 Main street,
Willimantic, Conn.
- Wilson, Julius H., No. 125 Twenty-second
street, Chicago, Ill.
- Wilson, William, No. 106 Broadway, cor.
Pine street, New York, N. Y.
- Winkleman, John H., cor. Liberty and
German streets, Baltimore, Md.
- Winslow, Edwin C., No. 107 Main street,
Danville, Ill.
- Winslow, Samnel W., No. 33 Kingston
street, Boston, Mass.
- Winter, Jonas, No. 81 West Franklin street,
Hagerstown, Md.
- Wiseman, Henry A., Main street, Danville,
Va.
- Wohlfarth, Justin, No. 2002 Third avenue,
New York, N. Y.
- Wolfe, Nathaniel, No. 213 Market street,
Wilkesbarre, Pa.
- Wolff, Lawrence, No. 333 South Twelfth
street, Philadelphia, Pa.
- Woltersdorf, Louis, No. 171 Blue Island
avenue, Chicago, Ill.
- Wood, Alonzo F., No. 2 Church street,
New Haven, Conn.
- Wood, Edward S., No. 14 Chauncey street,
Cambridge, Mass.
- Wood, Mason B., East Providence, R. I.
- Woodbridge, George W.*, No. 2 Faneuil
Hall Square, Boston, Mass.
- Woodruff, Roderick S., No. 91 Blank street,
Waterbury, Conn.
- Woodward, Samuel M., No. 91 North
Charles street, Baltimore, Md.
- Woodbridge, Napoleon, Cedar Key, Fla.
- Worthington, J. Willits, cor. Eleventh and
Arch streets, Philadelphia, Pa.
- Wrampelmeier, Theodore J., Ann Arbor,
Mich.
- Wright, Archibald W., cor. Front and Mar-
ket streets, Philadelphia, Pa.
- Wynn, William, No. 496 Fulton street,
Brooklyn, N. Y.
- Yatman, John L., Orange Valley, N. J.
- Yeakel, Nathan W., Nos. 107 and 109 Co-
lumbia street, Lafayette, Ind.
- Yorston, Matthew M., No. 429 Central
avenue, Cincinnati, (O.).
- Young, Alexander N., No. 103 Sixteenth
street, Wheeling, W. Va.
- Young, William, Park avenue, Rich Hill,
Mo.
- Young, Judson J., Kansas City, Mo.
- Zaegel, Max R., Eighth street, Sheboygan,
Wis.
- Zahn, Emil A., No. 1801 State street, Chi-
cago, Ill.
- Zeilin, John H., No. 512 Cherry street,
Philadelphia, Pa.
- Zeller, William S., Bellefonte, Centre coun-
ty, Pa.
- Zellhoefer, George, No. 91 Fulton street,
New York, N. Y.
- Ziegler, Philip M., No. 526 Penn street,
Reading, Pa.
- Zimmerman, Charles, Peoria, Ill.
- Zimmerman, John L., cor. Arch and Ray
streets, Searcy, Ark.
- Zoeller, Edward V., Tarboro, N. C.
- Zwick, George G., cor. Eleventh and Me-
ridian streets, Covington, Ky.

LIST OF DECEASED MEMBERS.

HONORARY MEMBERS.

		Elected.	Died.
Bache, Franklin, M. D.,	Philadelphia, Pa.,	1857	1864
Bailey, Montgomery, J., M. D.,	New York, N. Y.	1856	1873
Boullay, Pierre François Guillaume,	Paris, France,	1868	1869
Casselmann, Arthur, Ph. D.,	St. Petersburg, Russia,	1868	1872
Chevalier, Alphonse, M. D.,	Paris, France,	1871	1879
Deane, Henry,	London, England,	1868	1874
Durand, Elias,	Philadelphia, Pa.,	1857	1873
Farrington, Thomas,	Boston, Mass.,	1856	1867
Hanbury, Daniel, F. L. S.,	London, England,	1868	1875
Ludwig, Hermann, Ph. D.,	Jena, Germany,	1871	1873
Mohr, Frederick, Ph. D.,	Bonn, Germany,	1868	1879
Robinet, Stephane,	Paris, France,	1868	1869
Smith, Daniel B. (President, 1852-53),	Philadelphia, Pa.,	1856	1883
Squire, Peter, F. L. S.,	London, England,	1882	1884
Wiggers, H. August L., Ph. D.,	Göttingen, Germany,	1877	1880
Wood, George B., M. D.,	Philadelphia, Pa.,	1857	1878

ACTIVE MEMBERS.

		Elected.	Died.
Adolph, Albert,	Columbus, O.	1882	1883
Aimar, George Washington,	Charleston, S. C.,	1874	1877
Anderson, James H.,	New York, N. Y.	1859	1866
Andrews, George Wansay (President 1856-57),	Baltimore, Md.,	1856	1877
Aspinwall, James S.,	New York, N. Y.,	1855	1874
Atwood, Charles Henry,	Boston, Mass.,	1856	1877
Bache, Charles L.,	San Francisco, Cal.	1852	1854
Backus, James William,	Marine City, Mich.,	1867	1870
Badger, Charles William,	Newark, N. J.,	1870	1877
Balmer, James,	Baltimore, Md.,	1856	1866
Barry, John William,	Baltimore, Md.,	1856	1861
Baylis, William E. P.,	Brooklyn, N. Y.,	1860	1872
Baynon, John,	Shreveport, La.	1858	1862
Beam, Isaac Richard,	Baltimore, Md.,	1873	1879
Bell, Alexander C.,	Chicago, Ill.,	1879	1881
Bell, Gotthold Emanuel,	Louisville, Ky.,	1874	1879
Benzinger, John Sylvester,	Baltimore, Md.	1860	1869

		Elected.	Died.
Bertolett, William John,	Shreve, O.,	1872	1877
Betts, Howard Seeley,	Norwalk, Ct.,	1880	1883
Bidwell, Marshall Spring,	Elmira, N. Y.,	1871	1877
Bigelow, Francis O.,	Medford, Mass.,	1859	1863
Billings, Samuel J.,	New York, N. Y.,	1860	1865
Bingham, John Calvin,	St. Johnsbury, Vt.	1853	1870
Blair, Henry C.,	Philadelphia, Pa.,	1855	1862
Blauw, Hippolyt Anton,	Rochester, N. Y.,	1856	1870
Bowman, Henry K.,	Philadelphia, Pa.,	1869	1873
Boyden, Ashel,	Boston, Mass.,	1853	1877
Bray, Thomas William,	Wingham, Ontario,	1881	1882
Bright, James Evesson,	Worcester, Mass.,	1868	1872
Bringhurst, Ferris,	Wilmington, Del.,	1862	1871
Brown, John T.,	Boston, Mass.,	1859	1860
Brown, William,	Boston, Mass.,	1858	1875
Canavan, Benjamin,	New York, N. Y.,	1855	1857
Carney, Charles Tibbits,	Boston, Mass.,	1853	1862
Caspari, Charles,	Baltimore, Md.,	1856	1870
Catlin, Thereon,	St. Louis, Mo.,	1871	1880
Chapman, William B. (President 1854-55),	Cincinnati, O.,	1852	1874
Cherot, Leonce,	Memphis, Tenn.,	1865	1879
Churchill, George Washington,	Chelsea, Mass.,	1865	1869
Clency, William F.,	Cincinnati, O.	1859	1865
Coddington, Isaac,	New York City,	1855	1874
Colby, Moses D.,	Boston, Mass.,	1859	1870
Coon, Walter S.,	New York City,	1858	1861
Coppuck, Peter Van Pelt,	Mount Holly, N. J.,	1857	1869
Covell, Thomas Jefferson,	Rock Island, Ill.,	1864	1885
Crawford, William H.,	St. Louis, Mo.	1864	1885
Crawley, Francis Xavier,	St. Louis, Mo.,	1869	1882
Cressman, Noah,	Waterloo, Canada West,	1863	1864
Cunningham, James E.,	Pittsburg, Pa.,	1860	1863
Cushman, Alexander,	New York City,	1858	1861
Daggett, Alfred, Jr.,	New Haven, Conn.,	1865	1878
Dalrymple, Charles Hoagland,	Morristown, N. J.,	1860	1882
Davies, Robert Jones,	Brooklyn, N. Y.,	1858	1872
De Motte, Henry Augustus,	Jersey City, N. J.,	1871	1873
D'Evers, Henry Gaston,	Chicago, Ill.,	1865	1870
Dodge, John P.,	New York, N. Y.,	1865	1873
Dover, Thomas,	Dayton, O.,	1879	1881
Drischler, Francis,	New York City,	1881	1882
Dunk, Alfred Allen,	East Saginaw, Mich.,	1867	1879
Easterbrook, Ray B.,	New York, N. Y.,	1858	1868
Ellis, Charles (President 1857-58),	Philadelphia, Pa.,	1852	1873
Emanuel, Louis M.,	Linwood, Pa.,	1857	1868
Erben, John Singer,	Philadelphia, Pa.,	1868	1881
Everson, John C.,	Philadelphia, Pa.,	1863	1872
Eyster, Christopher Edward,	Yankton, Dak.,	1871	1877
Faber, John,	New York, N. Y.,	1857	1881
Fennel, Adolphus,	Cincinnati, O.	1864	1884
Fish, George Brewster,	Saratoga Springs, N. Y.	1860	1866

LIST OF DECEASED MEMBERS.

611

		Elected.	Died.
Fish, Henry Ferdinand,	New York, N. Y.,	1852	1868
Foley, James Thomas,	Houston, Texas,	1878	1879
Folger, William Swain,	Boston, Mass.,	1875	1878
Forester, Richard,	Brooklyn, N. Y.,	1860	1862
Fowle, Henry Dearborn,	Boston, Mass.,	1853	1882
Frohwein, Max,	New York, N. Y.,	1865	1877
Frohwein, Theobald,	New York, N. Y.,	1862	1883
Frost, John Johnson,	Lexington, Ky.,	1874	1880
Fulton, John Culpepper P.,	Brooklyn, N. Y.,	1873	1874
Gabaudan, Arthur W.,	New York, N. Y.,	1862	1870
Gaither, Francis Singleton,	Washington, D. C.,	1860	1876
Gay, William,	Cambridgeport, Mass.,	1858	1862
Geiger, Conrad John,	Canton, O.,	1866	1876
Gellatly, William Adams,	New York, N. Y.,	1858	1885
Gerhard, John C.,	Cincinnati, O.,	1862	1865
Geyer, Andrew,	Boston, Mass.,	1853	1855
Gilman, Samuel Kinsman, Jr.,	Boston, Mass.,	1876	1879
Gleeson, James Andrew,	Boston, Mass.,	1859	1880
Gleeson, Michael Henry,	Boston, Mass.,	1859	1879
Graefle, Frederick Alexander,	Baltimore, Md.,	1870	1873
Green, Thomas Townsend,	Poughkeepsie, N. Y.,	1858	1880
Griswold, William Henry,	North Adams, Mass.,	1874	1879
Groneweg, Louis,	Cincinnati, O.	1864	1866
Haddox, James Bowling,	Nashville, Tenn.,	1876	1880
Hair, Joseph C.,	Wilkesbarre, Pa.,	1881	1884
Harbaugh, Valentine,	Washington, D. C.,	1856	1871
Hardy, William Henry,	Clinton, Iowa,	1881	1884
Harwood, Lucien,	Warren, Mass.,	1875	1883
Hazard, Peter J.,	Philadelphia, Pa.,	1853	1876
Hegeman, Frederick Augustus,	New York, N. Y.,	1855	1860
Hegeman, William,	New York, N. Y.,	1858	1875
Henchman, Daniel,	Boston, Mass.,	1853	1878
Hensch, Hugo,	Cleveland, O.,	1872	1873
Hendel, Samuel Douglass,	St. Louis, Mo.,	1858	1871
Heydenreich, Frederick Victor,	Brooklyn, N. Y.,	1860	1879
Heyerdahl, Ulrich,	Faribault, Minn.,	1880	1882
Hill, Henry E.,	Detroit, Mich.,	1866	1868
Hollis, Thomas,	Boston, Mass.,	1853	1875
Hoagland, Pratt Ralph,	Boston, Mass.,	1867	1882
Hodge, Charles,	Portland, Or.,	1859	1881
Homann, James W.,	New York, N. Y.,	1875	1875
Hottendorf, Augustus W.,	Cincinnati, O.,	1864	1884
Howard, George Montgomerie,	Washington, D. C.,	1871	1877
Howarth, James L.,	Atlanta, Ga.,	1877	1881
Hughes, Henry Arnold,	Louisville, Ky.,	1857	1876
Huling, Bruce,	Cleveland, O.,	1873	1883
Hunt, Henry H.,	Balston Spa, N. Y.,	1870	1877
Hunt, James Lewis,	Hingham, Mass.,	1865	1884
James, Thomas Potts,	Cambridge, Mass.,	1857	1882
Jardella, Jerome B.,	Vincennes, Ind.,	1865	1870
Jenkjns, William Ellis,	Boston, Mass.,	1865	1869

		Elected.	Died.
John, Frederick L.,	Philadelphia, Pa.,	1856	1864
Johnson, Charles Pearson,	Memphis, Tenn.,	1868	1873
Junghanns, Charles A.,	Cincinnati, O.,	1858	1862
Kalb, Theodore,	St. Louis, Mo.,	1864	1882
Keffer, Frederick A.,	New Orleans, La.,	1862	1873
Kelsey, Henry, Jr.,	New Haven, Conn.,	1873	1883
Kennedy, Robert Chauncey,	Cleveland, O.,	1865	1868
Kent, Ashbury,	Cincinnati, O.,	1854	1860
Kent, William,	Cincinnati, O.,	1864	1867
Kettell, George Parker,	Charlestown, Mass.,	1867	1881
Kidder, Darius B.,	Boston, Mass.,	1858	1874
Kiersted, Henry Taylor (Pres. 1860-'62).	New York, N. Y.,	1856	1882
King, Alexander,	Buffalo, N. Y.,	1874	1876
King, Henry,	New York, N. Y.,	1858	1867
Knapp, Edwin Ezra,	Norwalk, Conn.,	1860	1862
Kolp, Christopher Henry,	Philadelphia, Pa.,	1876	1878
Krebs, Hugo,	St. Louis, Mo.,	1871	1880
Krummeck, Jacob,	Santa Fe, New Mexico,	1867	1878
Laidley, Joseph,	Richmond, Va.,	1852	1861
Lancaster, Thomas A.,	Philadelphia, Pa.,	1859	1875
Lane, Alfred Samuel,	Rochester, N. Y.,	1857	1881
Lane, James Bacheller,	Fitchburg, Mass.,	1856	1867
Lehlbach, Paul F.,	New York, N. Y.,	1872	1884
Leitch, Alexander,	St. Louis, Mo.,	1858	1868
Lewis, Thomas,	Brooklyn, N. Y.,	1867	1880
Lineaweaver, Kline Cyrus,	Washington, D. C.,	1864	1873
Lingelbach, Ferdinand,	Louisville, Ky.,	1874	1879
Little, William B.,	Panama, U. S. Colombia,	1857	1867
Lobstein, Jacob Fred. Daniel,	Sag Harbor, N. Y.,	1868	1884
Longshaw, William, Jr.,	Bayou Sara, La.,	1858	1864
Luckenbach, Edward H.,	Bethlehem, Pa.,	1870	1883
Lyman, Benjamin,	Montreal, Can.,	1875	1878
Lyman, Stephen J.,	Montreal, Can.,	1875	1879
Lyon, Charles H., Jr.,	Boston, Mass.,	1858	1871
McBride, James,	St. Louis, Mo.,	1864	1871
McConville, Michael Stanislaus,	Worcester, Mass.,	1859	1873
McDonald, John,	Brooklyn, N. Y.,	1860	1861
McIntyre, Timothy Caldwell,	Washington, D. C.,	1858	1862
McKay, George Johnson,	Eureka, Cal.,	1864	1880
McPherson, George B.,	Cincinnati, O.,	1867	1871
Mallinckrodt, Gustavus,	St. Louis, Mo.,	1869	1877
Marsh, Edward H.,	New York, N. Y.,	1858	1884
Massot, Eugene Leon,	St. Louis, Mo.,	1857	1871
Matt, Joseph,	Columbus, O.,	1872	1874
Mattern, Jonathan Cunningham,	Pittsburgh, Pa.,	1860	1876
Maxwell, James T.,	New York, N. Y.,	1855	1860
Mayer, Ferdinand F.,	New York, N. Y.,	1859	1869
Meade, Richard Hardaway,	Richmond, Va.,	1873	1880
Meakim, John (President 1855-56),	New York, N. Y.,	1852	1863
Melzar, Augustus P.,	Wakefield, Mass.,	1856	1874
Menard, Alexander Ambrose,	Macon, Ga.,	1877	1881

LIST OF DECEASED MEMBERS.

613

		Elected.	Died.
Merrell, William Stanley,	Cincinnati, O.,	1854	1882
Merrick, John Mudge,	Boston, Mass.,	1875	1879
Metcalf, Tristram Walker,	Brooklyn, N. Y.,	1857	1873
Milhau, John (President 1867-68),	New York, N. Y.,	1855	1874
Mott, William,	Saginaw City, Mich.,	1869	1883
Muller, William Henry,	Chicago, Ill.,	1865	1870
Mundy, William Chester,	Seneca Falls, N. Y.,	1880	1881
Nagle, John George,	Baltimore, Md.,	1863	1869
Nairn, Joseph Wilson,	Washington, D. C.,	1858	1875
Nadand, James William,	Cincinnati, O.,	1864	1868
Neate, William Isaac Collier,	Olympia, W. T.,	1880	1881
Neergaard, John William,	New York, N. Y.,	1859	1880
Norgrave, Samuel Kramer,	Pittsburgh, Pa.,	1857	1871
O'Brien, Joseph Christopher,	Baltimore, Md.,	1863	1873
O'Gallagher, James	St. Louis, Mo.,	1858	1882
Oliffe, William J.,	New York, N. Y.,	1858	1866
Osborn, William Henry,	Baltimore, Md.,	1870	1881
Osgood, Samuel W.,	Davenport, Iowa,	1858	1860
Palmer, Albert Gallatin,	Washington, D. C.,	1858	1860
Parker, Herschel,	Brooklyn, N. Y.,	1867	1870
Parrish, Edward (President 1868-69),	Philadelphia, Pa.,	1852	1872
Patten, John Frederick,	Bangor, Me.,	1871	1881
Peck, Sereno Parsons,	Bennington, Vt.,	1853	1859
Pettis, Newton C.,	North Adams, Mass.,	1868	1874
Philbrick, Samuel P.,	Boston, Mass.,	1852	1859
Phillips, Lewellyn,	Baltimore, Md.,	1856	1865
Pile, Wilson Hunt,	Philadelphia, Pa.,	1857	1881
Platzer, Robert,	Philadelphia, Pa.,	1865	1874
Plummer, George Bolton,	Hinsdale, Mass.,	1875	1882
Polhemus, James L.,	Sacramento, Cal.,	1866	1867
Pollard, Charles P.,	Marysville, Cal.,	1859	1869
Porter, Henry Clinton,	Towanda, Pa.	1869	1877
Powers, Charles J.,	Syracuse, N. Y.,	1882	1883
Preston, Alfred J.,	Portland, Me.,	1873	1879
Procter, William, Jr. (President 1862-63),	Philadelphia, Pa.,	1852	1874
Pyle, James Lindley,	Brooklyn, N. Y.,	1859	1866
Raas, Francis,	Brooklyn, N. Y.,	1877	1884
Reh fuss, Lewis,	Cincinnati, O.,	1854	1856
Reifsnider, William Edward,	Baltimore, Md.,	1864	1872
Reinhold, Bernard H.,	New York, N. Y.,	1861	1875
Ricker, George Dexter,	Boston, Mass.,	1858	1881
Rideout, James William,	Brooklyn, N. Y.,	1875	1880
Ritson, Alfred,	Columbus, O.,	1870	1879
Roberts, David,	Boston, Mass.,	1858	1863
Rollmann, Frederick,	Philadelphia, Pa.,	1862	1864
Roemer, Daniel,	Cincinnati, O.,	1865	1870
Ross, George,	Lebanon, Pa.,	1878	1880
Sands, Jesse M.,	New York, N. Y.,	1860	1867
Schmidt, Henry,	New York, N. Y.,	1874	1875
Schmidt, William George,	Louisville, Ky.,	1874	1877
Scott, David,	Worcester, Mass.,	1855	1878

		Elected.	Died.
Scott, John,	Cincinnati, O.,	1854	1873
Scully, Harmar Denny,	Pittsburgh, Pa.,	1858	1866
Selfridge, Matthew Merthirall,	Philadelphia, Pa.,	1858	1881
Shoemaker, Joseph Lybrand,	Philadelphia, Pa.,	1867	1880
Smith, Auburn,	London, O.,	1880	1882
Smith, Charles Augustus,	Cincinnati, O.,	1852	1862
Smith, Edward Alexander,	Baltimore, Md.,	1870	1875
Smith, Edwin R.,	Monmouth, Ill.,	1862	1869
Smith, John William,	Norfolk, Va.,	1873	1876
Smith, Samuel A.,	Newburyport, Mass.,	1859	1874
Smither, Charles,	Buffalo, N. Y.,	1881	1882
Snowdon, George M.,	Philadelphia, Pa.,	1857	1879
Squire, William Henry,	Germantown, Pa.,	1862	1865
Stabler, Rich. Hartshorne, (Pres. 1870-71),	Alexandria, Va.,	1856	1878
Steiner, Henry,	Philadelphia, Pa.,	1857	1858
Stephen, William Gibson,	Yonkers, N. Y.,	1860	1878
Stevens, Ashbel Mead,	Cincinnati, O.,	1854	1860
Stevens, Rufus Walker,	Somersworth, N. H.,	1859	1868
Suding, Henry Aloysius,	Baltimore, Md.,	1870	1875
Sweetser, Thomas Augustus,	South Danvers, Mass.,	1859	1860
Talbot, Stephen Liversidge,	Providence, R. I.,	1882	1883
Taylor, Robert James,	Newport, R. I.,	1859	1871
Taylor, William,	Philadelphia, Pa.,	1868	1871
Thayer, Henry,	Cambridge, Mass.,	1858	1882
Thomas, William,	Jersey City, N. J.,	1856	1856
Tilden, Henry Augustus,	New Lebanon, N. Y.,	1858	1884
Tompkins, Orlando,	Boston, Mass.,	1859	1884
Toplis, Robert John,	Yonkers, N. Y.,	1863	1882
Tulley, Andrew J.,	New York, N. Y.,	1862	1875
Uhl, Charles,	Memphis, Tenn.,	1860	1873
Vreeland, Frank Louis,	San Francisco, Cal.,	1880	1883
Waite, Samuel Brett,	Washington, D. C.,	1858	1862
Warren, Charles Henry,	Brandon, Vt.,	1872	1876
Warren, William,	Brighton, Mass.,	1867	1871
Watson, William J.,	Brooklyn, N. Y.,	1853	1872
Weaver, James,	New York, N. Y.,	1860	1883
Weaver, Joseph Thornton,	Philadelphia, Pa.,	1868	1882
Weisman, Augustus William,	New York, N. Y.,	1869	1883
Weyman, George Washington,	Pittsburgh, Pa.,	1858	1864
White, Daniel Fuller,	Charlestown, Mass.,	1859	1864
White, William P.,	Chicago, Ill.,	1865	1866
Whitehead, Silas,	Lynchburg, Va.,	1856	1858
Wilkins, Daniel Gilbert,	Boston, Mass.,	1865	1880
Willard, Joseph,	Chicago, Ill.,	1865	1878
Wilson, Adam Hill,	Philadelphia, Pa.,	1859	1880
Wilson, George C.,	Boston, Mass.,	1859	1861
Wiseman, Charles,	Baltimore, Md.,	1856	1862
Witzell, Louis,	Cincinnati, O.,	1864	1867
Wood, Gilbert Davidge,	Baltimore, Md.,	1856	1863
Woods, Samuel H.,	Boston, Mass.,	1859	1869
Wright, George,	New York, N. Y.,	1869	1873

LIST OF RESIGNATIONS.

615

		Elected.	Died.
Wright, William R.,	Boston, Mass.,	1875	1883
Young, John Edward,	Vergennes, Vt.	1875	1882

LIST OF RESIGNATIONS.

Name	Residence.	Elected.
½ Jenks, Thomas L.,	Boston, Mass.,	1875
½ Laycock, Washington,	Rondout, N. Y.,	1857
½ Linn, William B.,	New York, N. Y.,	1880
½ Moise, Benjamin F.,	Charleston, S. C.,	1876
½ Newton, John,	New York, N. Y.,	1880
½ Wendler, Robert F. W.,	Brooklyn, N. Y.,	1876
½ Vogeler, Adolph G.,	Chicago, Ill.,	1876

½ No reason given.

INDEX.

A.

- Abrotine, properties of, 321
Abrus precatorius, active principle and effects of, 182, 184
caution in use of, 184
Acid, benzoic from urine, 287
bitter of hop, properties, 330
boric, poisonous properties of, 272
caffetannic in tobacco, 300
callutannic, 147
caprylic, from thapsia resin, 169
carbolic, cause of reddening, 267
properties of, 266
solubility of, 267
chromic, amount of sulphuric acid in, 234
citric, detection of impurities, 292, 294
purification from iron, 290
formic, in cantharides, 202
gallic, test for, potassium cyanide, 300
hippuric, in gastric juice, 346
hydrobromic, preparation of, 214
hydrochloric, presence of tin in, 213
hydrocyanic, commercial quality, 224
determination of, 223
in bitter almond oil, 262
indication of alkalinity, 224
modified process for, 224
preservation in vials, 225
ready test for, 225
hydrosulphuric, apparatus for, 206
preparation of pure, 206
lactic, estimation of, 286
preparation of, 285
separation of, 286
leditannic, 147
nitric, reagent for, paratoluidine, 210
test for, in water, 210
osmic, use in neuralgia, 245
oxalic, decomposition in solution, 284
perosmic, use of, in cancer, 246
phosphoric, algaceous growth in, 432, 517
preparation of, 220
phosphorous, bleaching properties of, 220
picric, estimation in beer, 269
in test solution for glucose, 269, 284
pipitzaboic, origin of, 149
properties of, 150
quercitannic, properties of, 298, 299
salicylic, injurious effects, 288, 289
medicinal use of, 289
sclerotic, preparation of, 296
succinic in extracts, 69, 285
sulphuric, detection in organic acids, 212
free in salts, reagents for, 212
sulphurous, deterioration of, 211
tannic, determination of, in cells, 298
tartaric, detection of impurities in, 292, 294
powdered, variability of, 295
thapsic preparation and properties, 169
Aconite root, constituents of, 170, 314, 315
Aconitine for internal administration, 315
preparation by Duquesnel's process, 312
Ade, S. G., fungoid growth in dilute phosphoric acid, 432
Adolph, Albert, deceased, 490
Agaricus campestris contains poison, 121
Agricultural Bureau, appropriation for, 488
Albumen, action of ergot on, 123
dialyzed, 336
test for, in urine, 337
Alkaloids, mydriatic, reaction with mercuric chloride, 318
Alcohol, percentage and specific gravity of, 263
tax on, communication relating to, 505, 521
Alcohol, amylic, contains organic bases, 266
Alkalimetry, indicators in, 226
Alkaloids, constitution of, 302
in amylic alcohol, 266
reagents for (alkali sulphides, lead chloride), 301
solution of, algaceous growth in, 518
Aloe vulgaris, cultivation in St. Helena, 128
Alum, effect of, on teeth, 231
Alumina in saffron, 231
Aluminium for coating iron, 231
sulphate, properties of, 231
Amanita species containing poison, 121
Ammonia, chloral reagent for, 265
Ammoniac, reagent for, Plugge's, 168
Amomum Melagueta, analysis of seeds, 129
Andromeda japonica, constituents, 147
polifolia, constituents of, 147
Antiseptic dressings, 112
Ammonium benzoate, solubility of, 288
bromide, presence of barium in, 215
reaction of, 214
chloride, action on lead iodide, 218, 229
hyposulphite, use in analysis, 219
molybdate, test for-tannin, 240
Apocynum cannabinum, laticiferous vessels, 142.
Apomorphine, value as an emetic, 303
Apparatus, centrifugal use of, 41
extraction, Gawalowski's, 35
filtering, Burton's, 36
Hurty's, 39
for automatic filtration, Robinson's, 38
for producing small crystals, 59
percolating, Burton's, 36
Oldberg's, 388
pharmaceutical, Symes's, 49
Application for membership, form of, 560
Arbutin as a diuretic, 329
Arsenic, Reinsch's test, source of error, 242
hydrogen, action of, on silver salts, 242
Artemisia Abrotanum, alkaloid of, 161, 321
Artemisia tridentata, description of drug, 140
Aseboquercitrin and allied compounds, 148
Aspergillus glaucus in quinine, 124
Asphalt, composition of, 249
Aspidosperma Quebracho, action of, 143
Atropa Belladonna, estimation of alkaloids in root, 114
Atropine, constitution of, 316
preparation of, 315
reaction with mercuric chloride, 318
B.
Bacteria, diastatic ferment in, 338
Balances, improvements for, 31
Balsam Lagam, constituents of, 185
Balsam Peru, clarification of, 184
Bartlet, W. W., opium assays, 475
Barium chloride contains aluminium, 229
Beet, analysis of, 120
chromogen in juice of, 133
Benzoin, Siam, origin of, 146
trees yielding, 146
Berberine sold as hydrastine, 511
Betts, Howard L., deceased, 491

Biroth, H., new poison case, 422
 pepsau, 420
 Bismuth breath, cause of, 240
 salicylate, preparation of, 242, 289
 subnitrate, detection of arsenic in, 241
Blumea lacera, volatile oil of, 161, 253
 Boiler, steam, bayonet-joint, 49
 Patch's, 44
Boldoa fragrans, analysis of, 200
Boletus edulis contains poison, 121
 Bones and bone ash, composition of, 221
 Boroglyceride, preparation of, 271
 Bottles, stock, labeling of, 61
 yellow, for pharmaceutical preparations, 61
 Bougies, medicated, preparation of, 92
 Burette clamp, new construction, 32
 Burner, Bunsen's long flame, 43
 safety, Ehrenberg's, 44
 Bromides, alkali, reactions of, 214
 Bromine, detection with chlorine and iodine, 215
 historical notes, 214
 Brucine, separation from strychnine, 312
 By-laws, 549
 amendments to, acted on, 532,
 proposed, 17, 481, 510, 520, 532
 of the Council, 557

C.

Cacao, contains caffeine, 171
Cærulignol and derivatives of beech tar, 248
 Caffeine, action of hydrochloric acid, 319
 in cacao, 171
 citrate, poisonous dose, 320
 Calamine, commercial, 235
Calamus Draco, resin of, 127
 Calcium hydrate, solubility in water, 230
 lactophosphate, preparation, 287
 phosphate, gelatinous, 221
 separation from strontium, 229
 sulphide, preparation and use of, 230
Camellia oleifera, saponin in seeds, 172
 Camphor, manufacture of, in Japan, 132
Canella alba, constituents, 175
 Cannabin tannate, effects of, 321
 Cantharides contain formic acid, 202
 Canutillo, origin and use of, 462
 Caoutchouc, collection in Brazil, 176
 cultivation in Ceylon, 176
 Carbon, bisulphide, poisoning by, 223
 Carvol from different sources, 256
 Cascara amarga, description, structure, constituents, 189
Ceanothus americanus, analysis of leaves, 190
 Cellulose, fermentation of, 279
 use of, as a dressing, 279
 Chewstick (See Gouania.)
 Chinoline, compound with chloral, 323
 reaction with phenols, 322
 Chloral, compounds with alkaloids, 265, 306, 323
 test for ammonia and for sulphides, 265
 Chlorine, detection of, with bromine and iodine, 214, 215
 water apparatus for, 212
 Chlorophyll, constitution of, 333
 for coloring fats, 335
 pure, preparation, 334
 Chromogens, formation in plants, 332
 Cinchocerotin, 277
 Cinchona, alkaloids for elixirs, 305
 assay of, Phar. Ger., correction, 163
 Prollius, 163
 U. S. P., 474
 cultivation in Bolivia, 162
 in Guatemala, 162
 in Java, 162
 in St. Helena, failure of, 161
 difficulty of exhaustion, 100, 165
 Indian, analysis of, 163,
 statistics of shipment, 358
 succirubra, aqueous extraction, 165
 assay for alkaloids, 64
 natural and renewed bark,
 assay, 162
 Cinchonamine, salts of, characters, 311
 Cinchonidine benzoate, preparation, 310
 Cleanliness in pharmacy, 426

Coblentz, V., Commercial bromide of potassium, 433
 Cocculin, properties of, 327
Cocculus indicus, new constituent of, 171
 Codeine, hydrobromide, 303
 phosphate for hypodermic use, 303
 Coffee, Brazilian, analysis of fruit, 165
 physiological action of, 166
Colcord, J. W., Canutillo, 462
 Rhubarb, its history, habitat, culture, 463
 Collodion, combinations of, 62
 cotton, preparation of, 280
 Cologne water, formula, 90
 Committee, auditing, 508
 from National Wholesale Druggists' Association, 500
 nominating, appointed, 487
 report of, 497
 on Centennial Fund, 5
 on Drug market nominated, 498
 report of, 348
 on entertainments, 532
 report of, 505, 529
 on exhibition, appointed, 497, 501
 report of, 379
 on finance, 508
 on legislation, nominated, 498
 report of, 364
 on legislation on proprietary medicines, 528
 on meeting in California, report, 502
 on membership, 508
 report of, 489
 on papers and queries, nominated, 493
 report of, 508
 on President's address, 497
 report of, 520
 on prize essays, nominated, 498
 report of, 505
 on publication, 508
 report of, 493
 on report of entertainment committee appointed, 508
 report of, 528
 on report on unofficial formulas, 508
 on sale of condemned drugs, 488
 report of, 495
 on specimens for national museum, 4
 on time and place of next annual meeting appointed, 504
 report of, 508
 on unofficial formulas, 4
 report of, 506
 to visit National Wholesale Druggists' Association, 523
 Condenser, Liebig's modification by Shenstone, 52
 Simand, 53

Conium, substitution for, 168
 Constitution, 548
Convallaria majalis, substitute for *digitalis*, 128
 unpleasant effects of, 128
Copaiba, test for purity, 185
 Copper, poisonous action, 236
Coptis trifolia, constituents of, 171
 Cordial, blackberry, formula, 62
 hop, formula, 63
 Cosmetic, Hungarian, formula, 113
 Cotoin, physiological action of, 331
 Cotton, naphthalin, formulas, 113
 Council, minutes of organization of, 508
 Creasote, beech wood, tests for, 269
Croton Draco, resin of, 126
 Crotonol, preparation and use of, 196
 Crucibles, nickel, use of, 55
 Cruciferae, mustard oil in, 262
Cummings, H. T., a study of percolation, 398
Cutter, E. W., report on drug market of Boston, 360

D.

Decoctions, filtration and preservation of, 75
 Dialysis, use of chloroform water in, 41
 Diastatic ferment in bacteria, 338
Diehl, C. L., Report on the progress of pharmacy, 25
 Diethylacetal, new anæsthetic, 266

Dimethylacetal, new anæsthetic, 266
 Donations transferred to permanent fund, 525
 Dracæna Draco, resin of, 127
 Dragon's blood, varieties of, 126
 Dressings, antiseptic, 112
 medicated gelatin, 113
 Drops, dispensing by, 34
 size of, 33
 weight of, 33
 examination for adulteration, 485, 526
 new, discussion on, 516
 Drugs, package prices of, 349
 Drying oven, improvement by Seelig, 54
 Duboisia myoporoides, structure of leaves, 138

E.

Ebert, A. E., Report on meeting in California, 502
 Elixir of cinchona alkaloids, 62
 gentian with ferric chloride, 62
 hydrastine and bismuth, 514
 Emulsion of cod liver oil, formulas, 80
 copaiba with tincture of iron, 419
 paraldehyde, 84
 Entertainments, 541
 resolution referring to, 539
 Ephedra, yields canutillo, 463
 Epicauta ruficeps, 203
 Epiphytes, West Indian, 118
 Ergot, action of, on albumins, 123
 active constituents of, 121
 coloring matter of, chemical behavior, 123
 poisonous constituents of, ptomaines, 122
 removal of fat from powder, 87, 123
 use of, in delirium tremens, 123
 Ericaceæ, constituents of, 146
 Eriodictyon californicum, description of leaves, 141
 Ether, redistillation of, 263
 slow oxidation of, products, 264
 Ethylhydrastine, 456
 Euonymin, preparation and characters of, 71
 Exhibition room, closing of, 486, 509, 539
 Extract, calabar bean in constipation, 69
 canella alba, preparation, 69, 175
 cinchona, red, preparation, 63
 ergot, constituents, 121
 ferri pomatum, granular, 69
 licorice, examination of, 67
 meat, preparation of, 71
 quality determined, 70
 nux vomica, alkaloidal strength, 66
 standard preparation, 65
 wheat flour, preparation, 63
 fluid, calumba, proper menstruum for, 74
 canella alba, preparation, 75, 175
 cinchona, red, preparation, 72
 notes on some, 392
 prunus virginiana, modified formula for, 73
 senega, modified formula for, 74
 vanilla, formula for, 110

F.

Fats (see Oils, fixed).
 Ferric arsenate, commercial, 242
 Ferric chloride, in diphtheria, 232
 ethylate, properties, 232, 264
 oxide, preparation of, 232
 subsulphate, composition of, 234
 succinate, uses of, 285
 sulphate, antiseptic action, 233
 sulphide, preservation of, 207
 Ferrous iodide, preparation and preservation, 79, 87, 218
 sulphate, precipitated, composition, 233
 Filter for precipitates, paper pulp, 38
 rapid filtration, 38
 Flasks, coating of, for high heat, 60
 Flemingia congesta and rhodocarpa, wurus from, 198, 199
 Food products, method of analysis of, 119
 Fraxinus excelsior, analysis of leaves, 179
 Frohwein, Theobald, deceased, 490
 Fungi, edible, contain poisonous principles, 121
 preservation of, 120
 Funnel, separating, simple construction, 39
 support, new construction, 40

G.

Galazyme, 340
 Galls, varieties of, 200
 Gamboge, production in Ceylon, 173
 Garcinia purpurea, 145
 Gastric juice, hippuric acid in, 346
 Gauze, antiseptic, 112
 Gelatin, assay and valuation, 343
 medicated, for dressings, 113
 Gelsemium sempervirens, diagnostic characters of, 144
 Gentiana lutea, microscopic character of plant, 142
 Geum album, use of, 182
 Ginseng, collection in Minnesota, 170
 Globularia Alypum, constituents of, 133
 vulgaris, constituents of, 133
 Gluten, test for, 342
 Glycerin, estimation of, 270
 use of, in ointments, 270
 Glycerite corrosive sublimate, external use of, 76
 tar, preparation of, 75
 Glycyrrhiza, bast bundles in, 186
 Goebel, E., Note relative to cinchona assay, 474
 Gold salts, reaction of, 245
 Gouania domingensis, structure of stem, 201
 Grapes, formation of coloring matter, 336
 Grindelia robusta, description and structure of, 155
 Gum arabic, granular, preparation of, 76, 88
 Gutta percha, cultivation in Ceylon, 176

H.

Hair, James, deceased, 497
 Hallberg, C. S., simultaneous fractional percolation, 392
 Hamamelis virginica, description, 179
 Hardy, W. H., deceased, 491
 Hectograph mass, preparation of, 115
 Heliotropin, synthesis of, 331
 Honey, production in Canada, 203
 Hop, bitter principle of, 199, 330
 Hop cordial, formula, 63
 Hopea species, tallow from, 145
 Hunt, J. L., deceased, 493
 Hydrastine, composition of, 451, 511
 crystalline form, 449
 medical properties of, 514
 process of manufacture, 448
 Hydrogen peroxide, action of, 206
 commercial, examination, 206
 use of, in analysis, 205
 Hydrohydrastine 454
 Hymenodictyon excelsum, constituents of, 166
 Hyocyanine, estimation in belladonna, 114
 Hyoscyamus leaves, odorous principle of, 135

I.

Ichthyol, preparation and uses of, 247
 Ilex species for Paraguay tea, 191
 Infusions, preservation and filtration of, 75
 Infusum cinchonæ, reaction with potassium acetate, 75
 Ingalls, John, President's inaugural address, 499
 Ink, indelible, without silver, 115
 writing, old formula, 115
 Invitations, 486, 498, 503, 504, 537
 Iodine, detection of with bromine and chlorine, 215
 in cod liver oil, 204, 217
 medicinal uses of, 217
 Ivy berries, constituents of, 167

J.

Jambosir, properties of, 180
 Jequirity (see Abrus)

K.

Kairine, effects of, 323
 Kamala, microscopic structure of, 197
 Kennedy, G. W., commercial cream of tartar, 445
 report on membership, 489
 Kephir, nature and uses of, 341
 Kline, M. N., report on the drug market, 348
 Kola, African, 172
 description of, 172

Koumiss, artificial, preparation of, 340
ferrated, 341

L.

Labels, waterglass for attaching, 62
Lard, preparation for pharmaceutical uses, 273
Laserpitin, preparation and derivatives, 328
Laserpitium latifolium, bitter principle, 169
Law, Pharmacy, Erie county, N. Y., 372
Milwaukee, old, 377
National, 364
New York State, 370
proposed, relating to apothecaries of the army and navy, 364, 527
Lead, action of organic acids on, 236
cochineal a test for, 236
Lead iodide, error in pharmacopœial test, 218
Ledum palustre, ericolin from, 146
variation in yield of oil, 147
Leeches, preservation of, 202
Legén contains strychnine, 202
Lehlbach, Paul F., deceased, 492
Liatris odoratissima, structures of leaves, 156
Lime, chlorinated, change on keeping, 213
Lime water, causes of inferiority, 77
Linseed, removal of acarus, 171
Liquids, officinal, relation of weight and measure of, 33
Liquores (see solutions)
Litmus solution, preparation of, 335
Lloyd, J. U., precipitates in fluid extracts, 410
Lobstein, J. F. D., deceased, 490
Loganin and loganetin, properties of, 327
Logwood, test for metals, 186
List of authorized agents, 11
colleges and associations sending delegates, 542
committees, 4
Council, 5
deceased members, 610
delegations, 486
members present, 22
resigned, 616
officers, 3
publications received, 544
queries to be answered, 13
societies, etc., receiving Proceedings, 545
Luffa ægyptiaca, analysis of fruit, 180
MacLagan, H., Mercurous and mercurioso-mercuric iodides, 442
modification of Kerner's test, 461
Malt, manufacture of, 124
microscopic examination of, 124
Marsh, Edward H., deceased, 491
Martin, H. W. C., Prevention of brittleness in plasters, 421
Mate, analysis of, 194
history of, 190
Measure and weight of liquids, 132
Members, alphabetical list of, 584
deceased, 490, 610
election of, 501, 508, 520, 528
honorary, 561, 584
resignation of, 616
roll of, 561
Menthol, use of, 114
Mercurous iodide, color of, 442
tannate, properties of, 243
Mercuric chloride, test for alkaloids, 243, 318
use of, in gonorrhœa, 243
cyanide, determination of, 223
iodide, separation from mercurous salt, 243
Mesembrianthemum crystallinum, percentage of alkali, 179
Methyl-orange as an indicator, 212, 323
Miller, A. W., artificial oil of gaultheria, 473
Minutes of the council, synopsis of, 488, 501, 508, 520, 528
of the first session, 478
of the second session, 497
of the third session, 507
of the fourth session, 520
of the fifth session, 528
Minyak lagam, characters and constituents, 185
tankawang, origin of, 145
Mixture, camphor, formula, 32

Mixture, castor oil and glycerin, formula, 82
for fetid feet, 115
Fothergill's asthma formula, 85
glass cleansing, 116
glycerin, formula, 82
insecticide, for plants, 114
paraldehyde, 84
pomegranate, process for, 83
potassium chlorate, with excess of salt, 85
quinine tannate, preparation of, 84
Morphine, assay of, 178
combination in opium, 302, 303
Mountain sage (See *Artemisia tridentata*.)
Mullein (See *Verbascum*.)
Mushrooms (See *Fungi*.)
Musk, commerce of, 205
Mustard, for table use, 114
Myrtus Jambosa, constituent of, 180

N.

Napelline, therapeutic uses of, 310
Naphtalin, in frost bites, 247
Naphthol, antiseptic value, 246
Narcotine acetate, preparation, 304
hydrochloride, properties, 304
meconate, properties, 303
sulphate, properties, 304
Nerumodorum, bitter principles of, 143
Nickel salts, preparation of, 234
Nicotine, synthesis of, 322
Nitrites, uncertainty of permanganate test, 208
Nitroglycerin, physical properties of, 270
Nux vomica, new glucoside of, 142, 327
standard extract and tincture of, 65, 103

O.

Oak bark tannin, 200, 298
Officers elected, 408, 540
nominated, 497
Oil, almond, bitter, removal of hydrocyanic acid, 262
beechnut, 276
betula lenta, composition of, 259
blumea lacera, 253
caraway, old, 256
cassia, adulteration of, 255
castor, production in India, 194
cinnamon, difference from cassia, 255
cloves, adulteration, 255
cod liver, percentage of iodine, 204
croton, purgative principle, 195
vesicating principle, 196
digallic, reagent for, 298
eucalyptus, substitution of, 253
gaultheria, artificial, 473
composition of, 257
preparation in Pennsylvania, 260
use in rheumatism, 261
hedge mustard, 262
mustard, in cruciferous seeds, 178, 262
olive, manufacture in Tuscany, 138
patchouly, stearopten of, 254
rose, test of purity, 254
rusci, commercial, 261
sesame, pharmaceutical uses of 276
sphæranthus indicus, 253
thuja occidentalis, 252
Oils, fixed, chemical examination, 272
colored by chlorophyll, 273, 335
new test, 272
detection of alcohol, 252
volatile, preparation of, 249
Ointments (See *Unguenta*.)
Oldberg, O., standard dimensions for simple percolators, 388
Opium, assay of, Phar. Ger., inaccuracy, 178
different processes, 475, 510
cultivation in Roumelia, 177
statistics, 353
Opuntia vulgaris, analysis of fruit, 179

P.

Paracotoin, effects of, 331
Pan, steam, bayonet-joint, 49

Paraffins, preparation of, 246
 Paraldehyde, administration of, 84
 antidote to strychnine, 266
 hypnotic action of, 265
 Paratoluidine, reagent for nitric acid, 210
 Paste for scouring, 115
Parsons, H. B., Practicability of Kerner's test, 458
 water of hydration in commercial sulphate
 of quinine, 457
 Pencils, neuralgia, 114
 Pentadesma butyracea, 145
 Pepsau, 420, 538
 Pepsin, crystal, preparation of, 339
 Percolation, apparatus for, 36, 388, 521
 simultaneous fractional, 392
 study of, review and critique, 398
 Percolators, standard dimensions of, 388, 521
 Perezia nana, description of, 150
 root, description and constituents of, 154
 Wrightii, description of, 152
 Perfumes, preparation of, 249
 Phaseolus vulgaris, alkaloid of, 188, 321
 Phenolphthalein as an indicator, 224
 Phenoresorcin, preparation, 329
Phillips, C. W., Emulsion of copaiba with tincture
 of iron, 419
 Phlobaphene, properties of, 298, 299
 Phoradendron flavescens, description and structure
 of, 167
 Phosphorus, determination in presence of lead, 219
 solubility of, 219
 Picramnine in cascara amarga, 190
 Pills, coating with gelatin, 85
 sugar, 87
 ferrous iodide, preparation, 87
 phosphorus, preparation with cacao butter, 86
 quinine, process of assay, 86
 Pilocarpine, therapeutic uses of, 322
 Piscidia Erythrina, active principle of, 187
 Pitch, composition of, 249
 Plants, air, of the West Indies, 118
 economic, of Brazil, 118
 medicinal, preservation in fresh state, 118
 Plasters, brittleness of, prevention, 421
 Poison case, description of, 422
 preservation of, discussion on, 532
 Pomegranate bark, analysis of, 181
 Popcorn for vomiting in pregnancy, 124
 Potassium bitartrate, commercial quality of, 445
 Potassium bromide, administration of, 217
 examination of, 433, 523
 carbonate from mesembrianthemum, 225
 chlorate in mixtures, 85, 214
 citrate, acidity of, 291
 cyanide test for gallic acid, 225
 iodide, administration of, 217
 commercial quality, 217, 218
 nitrite, commercial quality of, 208
 permanganate in diabetes, 231
 use in analysis, 231
 sulphate, poisonous action, 225
 with sulphur, composition, 226
 Potato, chromogen in juice of, 136
Power, F. B., on hydrastine, 448
 Precipitates in fluid extracts, 410, 538
 Prescription checks, form of, 60
 Prescriptions, manufacturers' preparations ordered
 in, 428, 540
 Presses, hydraulic and pharmaceutical, 41
 Proprietary medicines, exhibition of, 501
 Psychotria Ipecacuanha, structure of, 166
 Pterocarpus Draco, resin of, 126
 Ptomaines in ergot, 122
 Pulveres, 87
 Puneeria coagulans, nature of ferment, 136

Q.

Quassiin, preparation and properties, 325
 therapeutic uses of, 326
 Quercus Suber, cork from, 200
 Quillaya bark, saponin from, 182
 Quinine, combination with chloral, 306
 duty on, effects of abolishing, 356
 ferrocyanide test, improvements in, 305
 percentage of, in salts, 306
 statistics of importation, 356
 and iron citrate, commercial assay of, 291

Quinine and quinidine, compound of, 309
 sulphate, incompatible with potassium
 iodide, 307
 Kerner's test, modification of,
 461
 practicability of,
 458
 presence of fungi in, 307
 pure, preparation of, 306
 purity of, test for (benzene), 310
 water of hydration, 457
 sulpho-tartrate, with liquorice and coffee,
 307
 tannate, analysis of, 308
 in mixtures, 84
 solubility in gastric juice, 308

R.

Raiz del pipitzahuac origin and constituents, 149
 Raphanus Raphanistrum, oil of, 262
 Rennet, vegetable, 136, 340
 Reports of Committees—
 nominating, 479
 on drug market, 348
 on entertainments, 505, 529
 on exhibition, 379
 on legislation, 364
 on meeting in California, 502
 on membership, 489
 on papers and queries, 508
 on President's address, 520
 on publication, 493
 on prize essays, 505
 on sale of condemned drugs, 495
 on time and place of next meeting, 508
 on unofficial formulas, 506
 to Wholesale Druggist's Association, 523
 Report on credentials, 486
 of treasurer, 524
 on the progress of pharmacy, 25
 Resolutions of thanks, 537
 relating to publication of debates and
 to entertainments, 539
 Retorts, coating of, for high heat, 60
 Rhubarb, history, habitat, culture, 463
 Rice, oil in embryo of, 124
 Ricinus communis, cultivation in India, 194

S.

Sabal serrulata, structure of fruit, 126
 Saffron, contains alumina, 129
 sophistication of, 129
 Salt, manufacture of, at Pomroy, 228
 Saponin from quillaia and saponaria, 324
 Santonin, administration of, 329
 manufacture in Turkestan, 329
 Scammony, adulterated with resin of root, 142
 commercial quality, 142
 Sierra salvia. (See Artemisia tridentata.)
 Silver, bromide, action of ammonia on, 244
 chloride, acceleration of precipitation, 244
 action of ammonia on, 244
 metallic, prevention of tarnish, 244
 nitrate, action of arsenuretted hydrogen, 242
Simms, G. G. C., cleanliness in pharmacy, 426
 Skins, animal, ointment for preparing, 58
 Soap, analysis of, 274
 vehicle for medicines, 275
 Soda, manufacture of, 227
 Sodio-bismuth citro-pyroborate, soluble, 291
 Sodium bromide, reaction of, 214
 chlorate, medicinal value of, 214
 choleinate, preparation of, 347
 hippurate, administration of, 346
 hypobromite, reagent for ammoniac, 168,
 215
 hyposulphite, antiseptic value, 211
 koussinate, preparation of, 207
 nitrite commercial, quality of, 208
 dose of 209
 stearate, preparation of, 274
 sulphate, dried, preparation of, 228
 sulphocarbonate, medical uses of, 267, 268
 Solution, acid carbohc, for disinfecting, 80
 ammonium valerianate, odorless and taste-
 less, 77

- Solution, Fehling's, permanent, 80
 ferric albuminate, phosphorated, 79
 ferric chloride, modified process, 78
 density and strength, 111
 ferrous iodide in glycerin, 79
 with alcohol, 218
 gum arabic, extemporaneous, 76
 hypophosphites, formula, 78
 lime, causes of inferiority, 77
 litmus, preparation of, 335
 magnesium citrate, formula, 77
 mercuric formamidate, use of, 80
 Wickersheimer's wine preserving, 80
 Solutions, hypodermic, with carbolated water, 76
 Sorghum, manufacture of sugar from, 124
 Specific gravity, paper on, 32
 Sphæranthus indicus, volatile oil of, 161, 253
 Spirit, Brettfeld, formula, 91
 Cologne, formula, 90
 Nitrous ether, commercial quality, 89
 composition, 88
 detection of acid reaction with
 potassium iodide, 90
 process for preparing, 89, 90
 Squire, Peter, deceased, 493
 State Pharmaceutical Associations, date of organi-
 zation, 26
 meetings, offi-
 cers, and pa-
 pers read be-
 fore, 27
 Still, pharmaceutical combination, Patch's, 46
 water, automatic, 51
 Stopcocks, simple forms of, 59
 Stoves, gas, improved construction, 43
 Strawberry pomade, 58
 Strontium, separation from calcium, 229
 Strychnine, antidote for, paraldehyde, 312
 in legén, 202
 separation from brucine, 312
 solubilities of, 312
 Sugar cane, determination of glucose in, 281
 grape, popular errors about, 283
 picric acid, test for, 284
 use for Fehling's solution, 80
 in tobacco, 135
 maple, imitation of, 282
 milk, laxative effect, 284
 use for infants, 284
 sorghum, manufacture in the U. S., 282
 quality, 281
 Sulamita vitulus, antineuralgic, 181
 Sulphides, chloral reagent for, 210, 265
 Suppositories, plastic clay as a base for, 91
 vaginal, with gelatin, 92
 Syrupus aurantii ferratus, formula, 95
 calcii et ferri phosphatis, new process, 98
 lactophosphatis, new process, 97
 ferri iodidi, Dupasquier's, 97
 preservation (alcohol, glycerin)
 97
 protochloridi, formulas, 96
 quininæ et strychninæ phosphatum
 variation, 98
 lactucarii, improved processes for, 94
 niccoli bromidi, formula, 96
 olei ricini, formula, 95
 picis liquidæ, formula, 95
 pruni virginianæ, modified formula, 93
 compositus, formula, 93
 quininæ sulpho-tartratis with licorice and
 coffee, 95, 308
 zinci bromidi, preparation of clear, 96
 zingiberis, preparation of clear, 94

T.

- Tablets, fumigating, formula, 113
 Tallow, vegetable, from Singapore, 144
 Tapioca, manufacture in Malacca, 196
 Tartar, crude, determination of acid in, 295
 emetic, valuation of, 295
 Tellurium the cause of bismuth breath, 240
 Thapsia resin, composition of, 169
 Theobromine, preparation and salts of, 320
 Thermometer, measurements by, 43
 Thiophen from coal tar, 247

- Thompson, W. S., President's address, 479
 Thuja occidentalis; volatile oil of, 201, 252
 Thymol, reaction of, 257
 Tilden, Henry A., deceased, 491
 Tin, action of organic acids on, 236
 presence of, in canned food, 238, 239
 Tinctura aconiti from green and dry drug, 108
 calumbæ, deposit in, 100
 menstruum for, 74
 canellæ albæ, menstruum for, 110, 175
 cardamomi comp., deposit in, 100
 chloroformi comp., deposit in, 100
 cinchonæ, alkaloids in precipitate, 100
 deficiency in alkaloid, 100
 digitalis, active principle in precipitate, 109
 ferri acetatis. precipitate in, 100
 chloridi, objection to alcohol, amount
 of iron, 111
 gentianæ composita, deposit in, 100
 hyoscyami, variation of, 109
 iodinii, pungency of, 111
 iodoformi comp., formula, 111
 ipécacuanhæ, deposit in, 100
 lappæ fructus, formula, 110
 lobeliæ ætherea, deposit in 100
 nucis vomicæ, difference in alkaloid, 101
 processes for, 101
 standard preparation, 103
 opii, commercial quality, 104, 106
 deodorata, process for, 107
 quininæ, deposit in, 100
 rhei, precipitate in, 100
 vanillæ, formula for, 110
 Tinctures of fresh herbs, 98
 standardizing by extract, 98
 Tobacco contains caffeotannin, 136, 300
 sugar, 135
 Tooth wash, formula, 114
 Traumaticin, composition and use, 79
 Trichlorphenol, antiseptic value of, 268
 Tropæoline, value as indicator, 323
 Tropeine and tropidine, with derivatives, 317
 Tufts, Chas. A., Treasurer's report, 524

U.

- Unguenta, bases for, 55
 lard for, 55
 use of glycerin in, 270
 Unguentum aquæ rosæ, manipulation, 56
 mixture with mercuri
 oxide, 57
 boroglyceridi, formula, 58
 fragariæ, formula, 58
 glycerini, formula, 57
 hydrargyri nitratis, use of different fats,
 57
 picis liquidæ, preparation from oil of tar,
 58
 Urea, artificial, substitute for quinine, 346
 assay of, 344
 Urine, albumen in, test for, 337, 344
 expansion of, correction for, 343
 Vanilla, cultivation of, in Mexico, 130
 new species from Guadeloupe, 131
 poisonous effects and origin of poison, 132
 Varnish, black, for bottles, 116
 colored, for tin, 117
 rapidly drying, 117
 transparent, for labels, 116
 Verbascum Thapsus, in consumption, 134
 Verdigris, adulteration and substitution, 284
 Veronica parviflora in dysentery, 134
 Vinum aloes, extemporaneous formula, 112
 picis liquidæ, formula, 112
 Viola arvensis, coloring matter of, 179

W.

- Walker, E., address of welcome, 478
 Wall, O. A., manufacturer's preparations ordered in
 prescriptions, 428
 Wasas (see Wurs)
 Wash bottle for hot water, 40
 Water, separation of, from saline solutions, 538
 tar, preparation from glycerite, 48

- Water-bath, constant-level, Bogardus, 50
Klement, 49
Pomeroy, 50
- Waters, medicated, preparation with calcium phosphate, 47.
removal of deposits, 47
- Weight by measure of liquius, 32
- Weismann, Augustus F., deceased, 492
- Wheat, analysis of, 120
- Wines, decomposition on distillation, 174
solubility of red color, 174
- Withania coagulans, nature of ferment, 136
- Wood wool, use of, as a dressing, 280
- Wright, Wm. R., deceased, 490
- Wurs, Wurrus, characters of, 198
origin of, 199
- X.
- Xanthium Strumarium, constituents of fruit, 156
- Xanthopuccine, probable non-existence of, 456, 513
- Y:
- Yeast, preservation of, 338
- Z.
- Zinc, pure, preparation of, 235

GENERAL INDEX

TO

VOLUMES EIGHTEEN TO THIRTY

OF THE

PROCEEDINGS

OF THE

AMERICAN PHARMACEUTICAL ASSOCIATION,

FROM 1870 TO 1882, INCLUSIVE.

COMPILED BY HANS M. WILDER.

PHILADELPHIA:

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PREFACE.

IN making this Index, the compiler has followed the same principles which guided him in the preparation of the General Index to the *American Journal of Pharmacy*, viz.:

1. To make it quite exhaustive (over 33,000 references).
2. To put all references under one (—at most two—) head, regardless of the synonyms used in the “Proceedings.”
3. To quote *all* synonyms found in the “Proceedings” with cross-reference to the one head under which references as to volume and page are put.
4. To accompany most references with a condensed statement of contents, as far as this could be done in a few words.
5. Preparations will be found under the English name of their respective class; salts, under the English name of the base.

The references themselves are easily understood. Thus—xxiii, 437 means: volume 23, page 437.

The titles of articles are printed in full-face type, while italics have been employed for the names of authors; the explanatory part of the titles is put in small capitals.

The two former indices to the “Proceedings” are found in Volume X. (1862) and Volume XIX. (1871).

HANS M. WILDER.

PHILADELPHIA, May 10th, 1884.

MEETINGS.

18th, Baltimore, Md.	1870.
19th, St. Louis, Mo	1871.
20th, Cleveland, O	1872.
21st, Richmond, Va.	1873.
22d, Louisville, Ky	1874.
23d, Boston, Mass	1875.
24th, Philadelphia, Pa.	1876.
25th, Toronto, Canada	1877.
26th, Atlanta, Ga.	1878.
27th, Indianapolis, Ind	1879.
28th, Saratoga, N. Y	1880.
29th, Kansas City, Mo	1881.
30th, Niagara, N. Y.	1882.

GENERAL INDEX.

VOLS. XVIII TO XXX INCLUSIVE.

A.

Aal root—*Morinda citrifolia*, India, cultivat. xxiv, 716; xxv, 163.
Asarum—a valerian—Turkestan, xxii, 120.
Abel, J., xx, 63.
Abies (Pliny):—**ALBA**, Mill. dict.:—**ARGENTEA**, De Chambr.:—*Abies pectinata*, D. C. xxvi, 313.
 — **BALSAMEA**, D. C., account, Morel. xxvi, 314—destruct. by insects, Peck, xxix, 236.
 — **BALSAMIFERA** Mich.:—**BALSAMINEA**, Duh.—*Ab. balsamea*, D. C. xxvi, 314.
 — **BRACTEATA**, Calif. xxvii, 601.
 — **CANADENSIS**, xxvi, 315—products and uses, Procter. xviii, 134.
 — **CANDICANS**, Fisch.—*Ab. pectinata*, xxvi, 313.
 — **CARPATICA**, Hort.—*Ab. excelsa*, D. C. xxvi, 323.
 — **DOUGLASSII**, Calif. xix, 306; xxvii, 601.
 — **EXCELSA**, D. C. xxii, 163; xxvi, 323.
 — **EXCELSA**, Link:—**EXCELSA COMMUNIS**, Loud.:—**EXCELSA GIGANTEA**, Hort.:—**EXCELSA NIGRA**, Loud.:—*Ab. excelsa*, D. C. xxvi, 313, 323.
 — **FORMINEA**, Elst.—*Ab. pectinata*, D. C. xxvi, 313.
 — **FOLIIS SOLITARIS**, etc., Clay—*Ab. balsamea*, D. C. xxvi, 314.
 — **LARIX**, Lam.—*Larix europea*, D. C. xxvi, 321.
 — **LONGONIANA**, Hort.—*Ab. excelsa*, xxvi, 323.
 — **MENZIESII**, Dougl. xix, 306.
 — **MERTENSIANA**, Bong. xix, 306.
 — **MINOR**, pectin. fol. etc., Pluckn.—*Ab. balsamea*, xxvi, 314.
 — **PECTINATA**, D. C. account, Morel. xxvi, 313; oil, prop. Godeffroy. xxvi, 438.
 — **PICEA**, Lindl.—*Ab. pectinata*, D. C. xxvi, 313.
 — **RUBRA**, C. Bauh.:—**RUGOSA**, Hort.—*Ab. excelsa*, D. C. xxvi, 323.
 — **TAXIFOLIA**, Desf.—*Ab. pectinata*, D. C. xxvi, 313.
 — **TAXIFOLIIS**, Hort.—*Ab. balsamea*, D. C. xxvi, 314.
 — **TAXIFOLIA**, Tournef.—*Ab. pectinata*, D. C. xxvi, 313.
 — **TENUIORE FOL.**, Tournef.—*Ab. excelsa*, D. C. xxvi, 323.
 — **VULGARIS**, Poir.—*Ab. pectinata*, D. C. xxvi, 313.
Abietite in Strassburg turp., Rochleder. xxvi, 314.
Abietene from *Pinus ponderosa*, constit., Sadtler. xxvii, 384—from *Pin. sabiniana*, constit., Thorpe. xxvii, 385—as erasive, xxvii, 628.
Ablaluz—*Asphodelus ramosus*, Morocco. xxiii, 133.
Abrojillo, Argent. Republ. xxiv, 764.
Abrus precatorius, root as licorice, India. xxiv, 192.—seeds analyzed, Warden. xxx, 244.
Absinthiin detect. in beer, Dragendorff. xxx, 339; Hoffstedt. xxii, 227; Wittstein. xxiii, 341.
Absinthium (wormwood) loss in drying. xxi, 202—germination of seed, Saunders. xxx, 566—uses in Greece. xxx, 191.
Absinthol, Wright. xxiii, 333.
Abulcases. xxv, 477.
Abushahere Hing (Bombay asafoetida). xxiii, 178; xxiv, 153.
Abutilon AVICENNAR, Kansas. xxix, 448.
 — **INDICUM**, bark descript. and use, India, Dymock. xxvi, 162—seeds, Dymock. xxv, 182.

Abutua NEGRA—*Chondodendron tomentosum*.; xxiii, 180.
Acacia (gum). See GUM ARABIC.
Acacia of Australia yield a good gum. xxii, 153.
 — **ADANSONIA**, Senegal. xxv, 212.
 — **ALBICANS**, Mexico. xxiv, 776.
 — **ALBIDA**, Senegal. xxv, 212.
 — **ARABICA**, India. xxiv, 191, 716—descript. of gum, Dymock. xxv, 212.
 — **BIDWILLII**, Australia. xxii, 153.
 — **CATECHU**. See also CATECHU.—examin. of gum, Masing. xxix, 213—resin, descript. and uses in India, Dymock. xxv, 213; xxiv, 718—Jamaica. xxiv, 736.
 — **CONCINNA**, fruit, Mauritius. xxiv, 741.
 — **DEALBATA**, Senegal. xxv, 212.
 — **DECURRENS**, Australia. xxii, 153—Calif. xxvii, 599.
 — **FARNESIANA**. See GASSIE.
 — **GREGII**, yields shellac, Arizona, Stillman. xxix, 211.
 — **HARPOPHYLLA**, Australia. xxii, 153.
 — **HOMALOPHYLLA**, Australia. xxii, 153—Calif. xxvii, 600.
 — **HORRIDA**, Cape Good Hope. xxiv, 738.
 — **LEUCOPHLEA**, India. xxiv, 718—gum examin., Masing. xxix, 213.
 — **LOPANTHA**, Calif. xxvii, 599.
 — **MELANOXYLON**, Calif. xxvii, 600.
 — **NILOTICA**, Senegal. xxv, 212.
 — **ODORATISSIMA**, India. xxiv, 718.
 — **PYCNANTHA**, xxii, 153—uses of bark, (Wattle) Margary. xxix, 211.
 — **SEYAL**;—**SING**, Senegal. xxv, 212.
 — **SPECIOSA**, gum examin, Masing. xxix, 213.
 — **VEREK**, Senegal. xxv, 212.
Acacia ARGENTEA;—**PIMPINELLA**;—**SPLENDENS**, Chili. xxiv, 766.
Acalypha CILIATA;—**INDICA**, descript. and uses in India, Dymock. xxviii, 142.
 — **PRUNIFOLIA**, Mexico. xxiv, 771.
 — **VIRGINIANA**, Kansas. xxix, 445.
Acanthaceae. xxv, 141; xxviii, 124; Kansas. xxix, 439; Mexico. xxiv, 773.
Acantho-Mastich, exud. of *Atractyl. gummisera*, Greece. xxiv, 141.
Acanthodium SPICATUM, descript. India, Dymock. xxviii, 124.
Acaroid resin yields picric acid, Wittstein. xxiv, 338—soluble in oil eucalyptus, Osborne. xxvii, 234—synonyms and therap. uses, Smith. xxx, 148.
Acarois (*Acaroides*) **RESINIFERA**. xxx, 148.
Aceite DE CANIME, New Granada—bals. copaiva. xxv, 214.
Acer DASYCARPUM;—**SACCHARINUM**, Kansas. xxix, 451.
Acetal, **ISOBUTYLIC**, prep., Oeconomides. xxx, 345.
Acetol, prep. (acetone and oxide silver) Emmerling. xxix, 296.
Acetone, detect. in wood spirit, Kramer. xxx, 346.—yields iodoform, xxx, 346.
Acetum CANTHARIDIS, is not merely a sol. of cantharidin, Squibb. xx, 63.
 — **SCILLAR**, addit. of alcoh. injur., Gregory. xxiv, 63.
Acetyl AROCONITIA, Wright and Luff. xxvii, 511.

- Acetyl APOSEUDACONITIA**, Wright and Luff. xxvii, 510.
 — **QUERCETIN**, Liebermann. xxviii, 344.
Acetylene, liquefaction, Cailletet. xxvi, 432—act. of ozone, Mailfert. xxx, 259—preparation, (chlorof. over ignit. copper). xxvi, 432.
Achicoria—Cichor. Intyb., Chili. xxiv, 765.
 — **SILVESTRE**, Argent. Republ. xxiv, 764.
Achillea AGERATUM, volatile oil, de Luca. xxiv, 143, 279.
 — **MILLEFOLIUM**, Calif. xxvii, 613; Kansas. xxix, 441.
 — **MOSCHATA** (Iva), analysis, Planta-Reichenau. xix, 285.—uses in Switzerland. xxix, 158.
Achilleina fr. Ach. moschata, Planta-Reichenau. xix, 285; xxix, 158.
Achras SAPOTA, Mexico. xxiv, 768.
Achroodextrin (α - β - γ -) Prop., Musculus and Gruber. xxvii, 439.
Achrosin in seeds of *Cassia occid.*, Closset. xxiv, 190.
Achyranthes ASPERA, India, descript., Dymock. xxv, 133.
Acids as antiseptics, Sieber. xxviii, 90—drop equivalent, Talbot. xxix, 34—estimation (vol. of carbon. ac. gas) Noel. xxvi, 376—purity of C. P., Siebold. xxii, 312—detect. of free, (pot. iod., bichrom, bisulph. carb.), Donath. xxviii, 212—tests: alizarin, Schaal. xxii, 282: ammon. molyb., ferroc. pot., Huber. xxv, 241; fluorescein. xxv, 242; mesitylen-chinon, Fittig. xxii, 276; violet or mallow fl. in glycerin, Stevenson. xxiv, 235.
Acid ABRIC, fr. seeds of *Abr. precator.*, Warden. xxx, 244.
 — **ACETIC**, act. upon resins, gum-resins and balsams, Hirschsohn. xxvi, 457—adult.: glucose. xxii, 250, 313; sulph. ac. xix, 339—as antiseptic, Sieber. xxviii, 90—in California, xxvii, 619—contamination: copper. xxv, 290; phosph. lime, Bruckner. xix, 220; iron and manganese. xxi, 358, 488—detect. of empyreuma (permangan.), Merck. xxi, 358; of mineral acids: methylanilin-violet, Witz. xxiii, 369; Ludwig. xxiv, 318; chlor. barium, Thresh. xxiv, 319; chlor. pot., Wharton. xxx, 380—dissolves: phosphorus, Vulpus. xxvi, 359; xxvii, 313; sulphur, Liebermann. xxvi, 344—estimation in wine, Weigert. xxviii, 304; in presence of extract. matter, Prescott. xxiv, 320.—history, Babcock. xxx, 379—hypodermic solut., Powers. xxvii, 94—inverting power on sugar, Behr. xxvi, 517—yields no iodoform, xxx, 346—no improvement in theory of preparation, Buchner. xxi, 356—preparation: Buchner (supports Mohr). xxi, 357; Hager (one vs. two equ. sulph. ac.) xxi, 357; Hirsch (one equ. acid, diluted) xxiii, 366; Maschke (two equ. ac.) xxi, 358—from lycopodium, Schaum, xix, 264; fr. methyl alcohol (ferment with mutton liver) Béchamps. xviii, 243; mycoderma aceti necessary; ozonized air does not produce acetic ac., Knieriem and Mayer. xxii, 250—separation fr. vol. acids (volatilize as acet. ammon.) xxiii, 368—tests of purity, Gaillard. xxvi, 530.
 — **ACETIC, DIBROMIDE**, prep. Hell and Mühlhausen. xxvi, 531.
 — **ACETIC, GLACIAL**, mixes clear with oils, Barnes xxiv, 320; Lymons. xxiv, 321—per cent. table, Rüdorff. xviii, 254—solidifying point, Rüdorff. xviii, 255—test of strength (oil turpentine) Bardy. xxviii, 304.
 — **ACETIC and PICRIC ACID** compound, Tommasi and David. xxii, 259.
 — **ACETOPROPIONIC**, Tollens. xxix, 311.
 — **ACONITIC**, in leaves of *Adonis vernalis*, Lindros. xxv, 171—in sugar cane juice, Behr. xxvi, 514, 548.
 — **ACRYLIC, MONOCHLORIDE**, xxvi, 533.
 — **AGARINIC**, in agaric, Fleury. xix, 263.
 — **AILANTHIC**, Norajan Daji. xix, 270.
 — **ALBUMEN**, Heynsius. xxiv, 388.
 — **AMIDOSULPHONIC**, Borglund. xxvii, 330.
 — **AMYGDALIC**, prep. (fr. oil bitter almond) Müller. xxii, 252.
 — **ANEMONIC**, Fittig. xxii, 126.
 — **ANEMONINIC**, Fittig; Buchheim. xxii, 126.
Acid ANGELIC, converted into valerian. ac., Oscher. xix, 221.
 — **ANTIMONIC**, behav. to sulph. hydrog. not analog. to arsenic ac., Wittstein. xviii, 240—temperature of reduct. by hydrog., Müller. xix, 138.
 — **APOPHYLLINIC**, fr. narcotia, Wöhler. xxix, 322.
 — **ARGENTO-NITRIC**, Berthelot. xxix, 281.
 — **ARSENICIC** (arsenic), volum. estimat. (hydriodic ac.) Naylor. xxviii, 247—temperat. of reduct. by hydrog., Müller. xix, 138.
 — **ARSENIOUS**, see also **ARSENIC**.
 — **ARSENIOUS** act. of metallic ferricyanides, Bong. xxvi, 369—oxidized into arsenicic ac. by bromine, Wagner. xxiv, 218—reduction (baryta), Bramé. xxix, 273—amorphous easier soluble than cryst., Buchner. xxi, 311.
 — **ASPARTIC**, fr. animal protein bodies, Ritthausen. xix, 236.
 — **ATRACTYLIC**, Lefranc. xix, 285.
 — **ATROLACTIC**, synthesis. fr. dichlorethyl benzol, Ladenburg. xxix, 322.
 — **ATROPIC**, synthesis fr. atrolactic ac., Ladenburg. xxix, 321.
 — **AZELAIC**, examin. of heptane, Thorpe. xxvii, 386.
 — **BELLADONNIC**, fr. belladonna, Buchheim. xxv, 308.
 — **BENZOIC**, as preservative of pharm. prep., Archer. xxvi, 534; superior to bisulph. lime or salicyl. ac., Mattison. xxvi, 536; Salkowski. xxiii, 373; Trimble. xxv, 290—pre-exists in benzoin, Loew. xix, 221; denied by Rump. xxvi, 534; united to a second acid, Rump. xxvii, 174—freed for cinnamic ac., Curtis. xxi, 222—commercial, quality, Bedford. xxx, 314—contaminat. with corrosive subl., Spöerl. xxviii, 308—not decomposed by air, Werner. xxii, 249—drug market. xxviii, 367; xxix, 370—fluid volume, Candidus. xxvii, 709—hypodermic sol., Powers. xxvii, 92—yields no iodoform. xxx, 346—pills, excip. (soap, bals. fir) Fairthorne. xxix, 313—preparation: fr. benzoin by acet. ac., Wagner. xxviii, 308; fr. benzotrichloride. xxix, 313; fr. chlorderacylic ac., Hartmann. xxiv, 323; fr. suint (wool fat), Taylor. xxvi, 534—act. of potassa, Barth. xxi, 360—act. of glucose and sulph. ac., Phipson. xxii, 251, 252—solubility, Bourgoin. xxvii, 463; xxviii, 310; in alcohol, Candidus. xxx, 564—source determined, Jacobsen. xxx, 381; Schacht. xxx, 380, 383; Schneider. xxx, 382; Schlickum. xxx, 381—synthesis fr. form. sod. and sulphocarb. pot., Meyer. xix, 221—in tolu, Busse. xxv, 208—yield fr. benzoin, Grosser. xxx, 188.
 — **BENZO-NITROBENZOIC**, Fittica. xxvi, 536.
 — **BIAZO-BENZOIC**, Meyer and Michler. xxii, 252.
 — **BILIARY**, test, (Pettenkofer modif.) Strassburg. xxi, 405; (syrupy phosph. ac. and sugar), Drechsel. xxx, 395; (Hoppe-Seyler modif.) Hilger. xxiii, 474.
 — **BISULPHANTHRACHINONIC**, Graebe and Liebermann. xxiii, 457.
 — **BORIC** (boracic), account, Foster. xxiii, 256—as antiseptic, Sieber. xxviii, 90—preservative act. upon meat due to form. of acid phosphates, Endemann. xxviii, 229—California. xxvii, 586—decomp. sulphates, Tate. xxix, 244—with glycerine, green flame, Iles. xxiv, 227—detect. by spectrum analysis, Dieulafoy. xxvi, 361—discussion. xxx, 656—drug market. xxix, 370; xxx, 463—prep. and uses, Dana, Jr. xxx, 553; fr. Strassfurtite, Krause. xxvi, 226; fr. "Teza." xviii, 227—solubility, Dana, Jr. xxx, 554; in alcohol, Candidus. xxx, 564—uses in surgery and cholera. xxx, 280.
 — **BOROCITRIC**, Scheibe. xxviii, 315.
 — **BUTYRIC**, as antiseptic, Sieber. xxviii, 90—contamin. with caproic ac., Burgemeister. xxi, 489—detect. in glycerin (alc., sulph. ac.) Perutz. xix, 255—fr. *Elodea Canad.* and sugar, Schützenberger. xxiii, 371—found in wash-water of starch, Thenius. xxvii, 459—invert. power on sugar, Behr. xxvi, 517—yields no iodoform. xxx, 346—preparation: fr. blood fibr., lact. ac., starch, Thenius. xxvii, 459; fr. rice,

Acid (Continued.)

- meat, milk, Grillone. xxii, 250; fr. starch, chalk, cheese, Enders. xxviii, 307; on large scale fr. glucose, St. John's bread, chalk. xxiii, 371.
- **CACODYLIC**, very poisonous, Lebahn and Schultz. xxviii, 283.
- **CAERULEO-SULPHURIC**. xxiv, 715.
- **CALUMBIC**, prep. by oxalic ac., Alessandri. xxx, 435.
- **CAMPHORIC**, prep., Fairthorne. xxix, 287.
- **CAMPBORONIC** (Kähler) fr. oil of Asar. can., Power. xxviii, 481.
- **CAMPHRESIC** (Schwanert) fr. asarol, Power. xxviii, 479.
- **CANTHARIC**, Piccard. xxvi, 614.
- **CARBO-ACETOXYLIC**, fr. dichloropropion. ac., Backunts and Otto. xxvi, 533.
- **CARBOLIC**, see also **PHENOL**.
- **CARBOLIC**, antidotes: alkal. and earths, Husemann. xxii, 237; sacch. lime, Husemann. xxi, 340; Jandousch. xxviii, 91; sulph. ac., Senftleben. xxviii, 284; sulph. sod, Sonneberg. xxviii, 285.—as antiseptic, Fischer. xxviii, 90—red color. xxvii, 415; due to copper, Fabini. xxix, 299; ammon. nitrite, Hager. xxviii, 284; heat and light, Heintz. xxiv, 98—color reaction with glycerin and sulph. ac., Reichl. xxv, 278—contamination, metals, Athenstaedt. xxx, 535—distinct. fr. cresylic ac. and creasote, Allen. xxvii, 417; Bedford. xxx, 573, 647; Clarke (nitr. ac., pot.) xxi, 341; Flückiger (chlor. iron, alcohol) xxi, 340; Reade (strong ammonia). xxii, 238—for isolation of curarin and narcein, Salomon. xxi, 340—colorless (suff. heating of crude) Schnitzler. xxiii, 352; (glycerin) Yvon. xxx, 353—as disinfectant. xix, 166—drug-market. xxi, 427; xxvi, 652; xxvii, 573—estimation: bromine, Degener. xxvii, 415; xxviii, 284; Cloetta and Schær. xxx, 352; Koppeschaar (details). xxiv, 297; conversion into sulphocarb. ac., Schædler. xxi, 339—protect. hypodermic solut. (one-sixth p. c.), Squibb. xxi, 591—dissolves indigo, Méhu. xxi, 392—liquefied for dispensing (10 p. c. glyc.) Facillides. xxi, 340—manufacture (by the aid of chimney gases) Heinze. xxx, 350—act. of nitric ac. (explos.) Wheeler. xxiii, 700—perfumed (oil lemon) xxvii, 122—purified: fract. crystallization, Read. xxii, 238; Alexejeff. xxx, 350; charcoal, Förster. xxviii, 231—tests: ammon. and chlorine, Almén. xxv, 292; Rice. xxi, 339; Salkowski. xxi, 338: anilin and chlorinated soda, Jacquemin. xxiv, 297; (is fallacious, Meppen. xxiii, 353;) bromine water more sensit. than iron, Landolt. xxi, 150, 339; chloroform, Guareschi. xxii, 238; ferric chloride, Hirsch. xix, 251; (indicates only 1:2000, Landolt. xxi, 339; prevented by glycerin, xxix, 303; prevented by several salts, Hager. xxviii, 312; in presence of salicyl., tannic and gallic ac., Hager. xxviii, 311;) molybdic and sulph. ac., Davy. xxvi, 494; xxvii, 416; oxanilin, Klunge. xxx, 353; proto-nitrate mercury, Plugge. xxi, 340; as sulpho carb. ac., Schædler. xxi, 339; Nietsch. xxvi, 495; sulph. ac., nitr. pot., Hoffmann. xxviii, 284; sulph. and nitr. ac., Lindo. xxvi, 494—act. on thymol, Hammarsten; Hirschsohn. xxx, 331—uses and formulas, Bakes. xxi, 137—wash, as disinfect. xix, 166.
- **CARBOLIC COMPOUND SOLUT.**, (benzoin, aloes, salicyl. ac.) Hager. xxviii, 59.
- **CARBOLIC POWDER** (clay) Curtman. xix, 158, 166.
- **CARBONIC**, estimat. in bicarbonates (phosph. copper), Lory. xviii, 225; in presence of sulphites and hyposulph. (bitartr. pot.), Pollaci. xxvii, 318; apparatus for estim., Gladding. xxx, 284—solubility in aromat. waters, Bothamley. xxx, 283—test in pres. of bicarbon. (rosolic ac.), Pettenkofer. xxiv, 231; previous heating necessary to avoid errors, Calmburg. xxii, 184—carbonic, liquefied, Cailletet. xxi, 285.
- **CARBOPYRIDINIC** (Huber) identical with nicotinic ac., Weidl. xxi, 366; Laiblen. xxviii, 343.
- **CARBOXYCINCHONIC**, Caventou and Willm.

Acid (Continued.)

- xviii, 262—constit., Skraup. xxvii, 495—identical with cinchonic ac., Weidel. xxvii, 496.
- **CARMINIC**, a black precip. with lime, Guignet. xxi, 392.
- **CAROBIC**, Peckolt. xxx, 177.
- **CARYOPHYLLINIC**, Mylius. xxii, 218.
- **CATECHU-TANNIC**, Etti. xxvi, 557.
- **CATHARTIC**, fr. senna as substitute, Witte. xxv, 321.
- **CEVADIC**, Wright and Luff. xxvi, 595.
- **CHAVICIC**, fr. black pepper, Buchheim. xxv, 320.
- **CHINOPICRIC**,—picrate of cinchona alk. xxii, 321.
- **CHINOVIC**, see **ACID KINOVIC**.
- **CHLORACRYLIC**, fr. trichlorolact. ac., Pinner and Bischoff. xxiv, 292.
- **CHLORDRACYLIC**, yields benzoic ac., Hartmann. xxiv, 323.
- **CHLORIC**, test (sulph. anilin), Boettger. xix, 184.
- **CHLOROCARBONIC**, see **PHOSGEN GAS**.
- **CHLOROPLATINIC**, Wilson. xxvi, 426.
- **CHLORSALYIC**, Kolbe and Lautermann. xxiv, 322.
- **CHROMIC**, adult. (17 p. c. glass) xxiii, 514—large crystals, Ficinus. xxi, 302—homemade, cost. xx, 206—glycerin explosive. xxiii, 296; xxiv, 249—preparation chrom. bar. nitr. ac., Duvillier. xxi, 302; simplified, Diehl. xxi, 302; evaporat. of chlor. chrom., Storck and Coninck. xxvi, 399—test for free in pres. of chromates, Donath. xxvii, 353.
- **CHRYSAMMIC**—tetranitrodioxanthrachinon, Sommaruga and Egger. xxiii, 386.
- **CHRYSOPHANIC**, distinct. fr. chrysarobin, Liebermann and Seidler. xxvii, 476—drug market. xxvi, 661; xxviii, 368; xxix, 370—formula, Rochleder. xviii, 273—found in wood of Tecoma Ipé, Peckoldt. xxii, 115—history, etc., Macmillan. xxvii, 473—identical with parietinic acid, Lindsay. xxv, 65—of rhubarb is inactive, Buchheim. xxii, 104—preparation: fr. Chlorea vulpina. xxv, 65; fr. araroba (with olive oil) Macmillan. xxvii, 474; fr. chrysarobin, Liebermann. xxvii, 476; fr. Physcia parietina, Lindsay. xxv, 65; fr. Placodium elegans, xxv, 65—solubility in fixed oils, Macmillan. xxvii, 474.
- **CINCHONIC**, constit., Weidel and Skraup. xxvii, 496.
- **CINNAMIC**, antiseptic value, Fleck; Barnes. xxx, 385, 386—estim. in bals. peru, Senior. xxx, 243—found in bals. of Liquid. styraciflua, Harrison. xxii, 113—for making artif. indigo. xxx, 446—yields no iodoform. xxx, 346—act. upon permangan. pot. xxx, 381—384—preparation fr. benzoin, Curtis. xxi, 222; fr. storax, Miller. xxiii, 160—solubility in benzin. xxii, 113.
- **CINNAMIC**, ARTIFICIAL fr. benzol chloride. xxx, 446.
- **CITRIC**, adult. (tartaric ac.) xxii, 313; xxiii, 516—act. of acet. bar., Kæmmerer. xix, 220—commercial, constit., Warrington. xxiv, 329—contamin. with lead (up to 10 p. c.), Reichardt. xxii, 313; xxix, 320—drug market. xix, 396; xx, 118; xxi, 426; xxii, 620; xxiv, 395; xxv, 351; xxvi, 652; xxvii, 556, 560, 568, 573; xxviii, 368; xxix, 370; xxx, 463—estimation: as citr. baryta, Creuse. xxi, 127, 363; as citr. lead, Fleischer. xxiii, 380—fluid volume, Candidus. xxvii, 709; xxviii, 420—inverting power on sugar, Behr. xxvi, 517—manufacture: Warrington. xxiv, 328, 329; in U. S. xxviii, 314; fr. cranberries, Moody. xxvii, 175; fr. Cyphomandra betacea, Silvestri. xix, 220; fr. Vaccin. vit. idaei, Græger. xxii, 255—solubility in alcohol, Candidus. xxx, 664—synthesis fr. glycerin, Grimaux and Adam. xxix, 319; fr. malic acid, Kekulé. xxix, 319—tests: bichrom. pot., Cailletet. xxvi, 545; Papazoglou. xxx, 379; heat with am. in sealed tubes, Sabanin and Laskowsky. xxvi, 547; xxvii, 471—yield: fr. lemon juice, Warrington. xxiii, 384; fr. cranberries, lemons, limes, oranges, Wehrli. xxvi, 546.

- Acid COCATANNIC**, Niemann. xxvi, 785.
 — **COLOPH-ALUMINIC**, Curie. xxiii, 321.
 — **COLOPH-ULMIC**, Curie. xxiii, 321.
 — **COPAIVIC**, is the only act. principle in cop., Roquette. xxvii, 394; xxviii, 368—preparation, Lucich. xxvii, 394—of German trade is fr. gurjun balsam, Brix. xxx, 242.
 — **COTARNAMIC**, muriate, physiol. act., Ott. xxvi, 277.
 — **CREOSOTINIC**, prep. and physiol. act., Buss. xxv, 294.
 — **CRESYLIC**, distinct. fr. ac. carbol. and creasote, Allen. xxvii, 417.
 — **CROTONIC** fr. monobrombutyric eth., Hell and Lauber. xxiii, 373.
 — **CRYPTOPHANIC**, in human urine, Thudichum. xix, 235; xxvii, 477.
 — **CUBEIC**, Bernatzik. xviii, 275—prep., Schulze. xxiii, 258—Bernatzik's and Schulze's acids not identical. xxii, 165.
 — **CYCLOPIC** fr. Cyclopia Vogelii, Church. xix, 308; xxix, 221.
 — **DIAMIDO-BENZOIC** as test for nitrous ac., Griess. xxvi, 341.
 — **DIAZOBENZOL-SULPHURIC**. xxvii, 296.
 — **DIBOROTARTARIC**, Dure. xviii, 259.
 — **DICARBOPYRIDINIC** fr. chinolin, Hoogewerff. xxviii, 331.
 — **DICHLORACRYLIC** fr. chloralid, Wallach. xxiv, 292.
 — **DICHLOROPROPIONIC** (α - β - γ -) Backunts and Otto. xxvi, 533.
 — **DICHROMATIC** fr. chlorophyll, Hoppe-Seyler. xxix, 354.
 — **DIMETHYLPARABANIC**—colestrophane, fr. cafein, Maly and Bücheregger. xxix, 345.
 — **DIOXYBENZOIC**, act. of sulph. ac., Barth and Senhofer. xxi, 360.
 — **DIOXYMALEIC**, Bourgoin. xxiii, 380.
 — **DITARTARIC**, Warrington. xxiv, 333.
 — **DUBOISINIC**, Müller and Rummel. xxviii, 122.
 — **ECHICERINIC**, prep. and prop., Gruppe. xxv, 372.
 — **ELAKOLIC**, Cloez. xxv, 285.
 — **ELAKOMARGARIC** fr. oil of Elaeococca vernic., Cloez. xxv, 284.
 — **ELAEOSTEARIC**, Cloez. xxv, 285.
 — **ELEMIC**, Buri. xxvi, 466.
 — **EQUINIC**, fr. milk of mares, Duval. xxiv, 338.
 — **EUGENIC**, characters as obt. fr. diff. sources, Pettit. xxix, 288.
 — **EUPHORBIC**, Buchheim. xxii, 160.
 — **FATTY**, estimat. in fixed oils, (soda, ether) Langier. xxvii, 427; improved, Hager. xxvii, 427—preparation, destruct. of albuminous envelope of fat, Bock. xxi, 346.
 — **FERRIC**, prep. (iron, nitr. pot.) xviii, 234.
 — **FERROUS**, (ferric oxide in hydrog.) Moisson. xxvi, 394.
 — **FILICIC**, fr. Aspidium marginale, Patterson. xxiv, 121.
 — **FORMIC**, act. of metallic ferricyan., Bong. xxvi, 369; of rhodium, ruthenium, iridium, Deville and Debray. xxiii, 317—concentrated, fr. conc. glyc. and dehydr. oxal. ac., Lorin. xxiii, 366—crystalline, Berthelot. xxiii, 366; Lorin. xxiv, 318—dissolves sulphur, xxvii, 301—estimation (acet. sod., corros. subl.), Portes and Ruysere. xxv, 290—inverting power on sugar, Behr. xxvi, 517—yields no iodoform. xxx, 346—generation fr. bisulph. carbon, Loew. xix, 183—preparation: fr. carbon, oxide over soda lime, Merz and Tibirica. xxvi, 530; xxviii, 303; glyc. and oxal. ac., Lorin. xxii, 250; details, Gaillard. xxvi, 530; fr. glyc., glycol, erythrite, mannite, dulcite, quercite, Lorin. xxii, 250; xxiv, 318.
 — **FRANGULIC**, prep., Faust. xxii, 281—probable convers. into emodin, Liebermann and Waldstein. xxv, 321.
 — **GALLIC**, behavior to sulph. ac., bichr. pot., chl. lime, Hamlin jr. xxix, 324—contamin. iron masked by oxal. ac., Hager. xxi, 493—fluid-volume, Candidus. xxvii, 709—preparation, heat necessary, Weber. xxviii, 316—distinct. fr. pyrogallic ac. and tannin, Watson. xxvii, 473—solubility in alcohol, Candidus. xxx,

Acid (Continued.)

- 664; in citr. pot., Long. xxx, 398—reconverted into tannin by oxychlor. phosph., Schiff. xxi, 362—test: ammonpicrate, Dudley. xxviii, 317; arseniate sod. or pot., Procter. xxiii, 388; fallacious, Flückiger. xxiii, 388; ferric chloride, in pres. of salicyl., carbol., tannic ac., Hager. xxviii, 313.
 — **GAMBOGIC**, Costelo. xxvii, 210.
 — **GELSEMINIC**, identical with aesculin, Robbins. xxv, 135—prep. and prop., Fredigke. xxi, 652; Wormley. xviii, 276.
 — **GENTIO-TANNIC**, better name for gentianin, Ville. xxvi, 222.
 — **GENTISIC**, Maisch. xxix, 505—in Fräsera Walteri, Kennedy. xxi, 637; xxix, 155—prep. and prop., Hlasiwetz and Habermann. xxiv, 173; Patch. xxix, 464—solubility, Patch. xxix, 462, 464.
 — **GLUCONIC** fr. saccharose and chlorine, Meisel. xxx, 378.
 — **GLUTAMIC**, in pumpkin plant, Schulze and Barbieri. xxvi, 278.
 — **GLUTAMINIC** fr. animal and vegetable protein subst., Hlasiwetz and Habermann. xxi, 395.
 — **GLYCOCHOLIC**, fr. oxgall (ether and miner. ac.), Hübner. xxiii, 474.
 — **GLYCYRRHIZIC**, Habermann. xxvii, 526; xxix, 351.
 — **GUAIACONIC**, blue with oxid. reagents, Schaer. xxi, 233.
 — **GUAIARESINIC**, does not turn blue with oxid. reagent, Schaer. xxi, 233.
 — **GURJUNIC**, Werner. xxiv, 173—melting point, Flückiger. xxvi, 268.
 — **GYNOCARDIC** fr. oil chaulmoogra, Moss. xxviii, 289; xxx, 472.
 — **HEDERIC**, Davies and Hutchinson. xxvi, 244; Kingzett. xxvi, 245.
 — **HEMIPINIC**—carboxylated protocatechuic acid, Wright and Beckett. xxvi, 564.
 — **HEPTA-RUTHENIC**, Deville and Debray. xxvi, 428.
 — **HIPPURIC**, isolation and estimat., Cazeneuve. xxvii, 548—react. with glucose and sulph. ac., Phipson. xxii, 252.
 — **HYDRATROPIC**, Ladenburg. xxix, 322.
 — **HYDRIODIC**, GASEOUS, (red phosph., iodine), Bannow. xxiii, 250.
 — **HYDRIODIC**, DILUTED, home-made, cost, Fredigke. xx, 206—act. of light, Lemoine. xxvi, 356 table of percentage, Topsøe. xix, 188—preparation: Bruylants, oil copaiva and iodine. xxviii, 226; Kolbe, iod., phosph., carb. ac. gas. xxv, 246; Meier, iod. pot., tart. ac., alc. xxv, 247; Stevenson, iod. bar., sulph. ac. xxvi, 356; Winckler, iod., bisulph. carb., sulph. hydr. xxviii, 225—strongest (58 p. c.) Topsøe. xix, 189—stability in syrup, Gilmore. xxx, 116.
 — **HYDROBROMIC**, GASEOUS, (brom. calc., sulph. ac. or: brom. pot., phosph. ac.), Bertrand. xxiv, 218.
 — **HYDROBROMIC**, DILUTED, per cent. table, Biel. xxx, 275—preparation: brom., carb. bisulph., sulph. hydr., Rice. xxviii, 226; brom., hydrocarbon oil, Bruylants. xxviii, 226; xxx, 273; brom., hydrog., red hot tube, Harding. xxx, 274; brom., hyposulph. sod., Hager. xxvi, 354; xxx, 273; brom., paraffin, Champion and Pellet. xviii, 220; xix, 185; brom., phosph., Markoe. xxiii, 686; xxiv, 219; brom., red phosph., Topsøe. xix, 185; brom., sulph. hydr. (34 p. c.) Fletcher. xxx, 272; McDonald. xxi, 294; Naumann. (both conc. and gaseous at same operat.) xxvi, 353; brom., sulphur, magnesia (35 p. c.), Rother. xxx, 273; brom. bar., sulph. ac., Geibel. xxix, 250; brom. pot., sulph. ac., water, Squibb. xxvi, 354; modified, Gilmore. xxx, 272; alcohol for water, Hager. xxvii, 306; brom. pot., tart. ac., Wade, Maisch. xxv, 245; alcohol for water, Rice. xxv, 245; add acid to the salt sol., not the other way, Gregory. xxvii, 306; distill. best; cold process gives a variable product, Thresh and Wright. xxx, 274.
 — **HYDROCHLORIC**, see **ACID MURIATIC**.
 — **HYDROCOUMARIC**, Zwenger. xix, 267.

- Acid HYDROCYANIC, ANHYDROUS** (chlor. calc. absolutely neutral), Girard. xxvi, 367.
- **HYDROCYANIC** (dilute), act. upon chloral and croton chloral, Pinner and Bischoff. xxiv, 292; of metallic ferri-cyan., Bong. xxvi, 369—does not preëxist in bitter almonds, Boettger. xxvi, 367—antidote, cupric sulph., Hager. xxviii, 92—commercial, exam., Harris. xxv, 361; is very variable, Towerzey. xxii, 184, 312—ready decomp. due to cyan. ammon., Cazeneuve. xxiv, 232—in bodies of dead animals, detect. easier in herbivor. than carnivor., Brame. xxx, 286—detect. possible after a long period, Rennard. xxiii, 262; Reichardt. xxx, 285; Sokoloff. xxiv, 232; Zillner (115 days) xxx, 285—estimation: Koster. xxii, 62; Siebold (Liebig's method, precautions). xxvii, 319; Vielhaber (chrom. pot., nitr. silv.). xxvii, 320—formed in dist. of spir. æth. nitr., Schoor and Schmidt. xxix, 93; fr. nitrobenzol and caust. alk., Post and Hübner. xxi, 286; fr. picric ac. and baryta, Wöhler. xxi, 286—preparation fr. cyan. zinc, pot., Proctor. xxiii, 263—preservation: diluted alcohol, Gault. xxiii, 265; Lloyd. xxiii, 695; xxvi, 705; glycerin, Williams. xxiii, 265; diluted keeps better than conc., Shenstone, Siebold. xxiii, 264—synthesis (acetylene, nitrog., electric spark), Berthelot. xix, 182—tests: guaiac and copper sulph., Boettger (paper). xxvi, 367; unreliable, Greiner. xix, 200; Rennard. xxiii, 263; reliable, Scoutetten. xviii, 260; picric acid, Hlasiwetz. xxvii, 321; protosalt of iron, nitr. uran., Lea. xxiii, 263; Prussian blue test more reliable than supposed, Lea. xxiii, 263.
- **HYDROCYANIC, SOLID**. Lescœur and Rigault. xxviii, 232.
- **HYDROFLUORIC**, corros. act., Robbins. xxx, 277—crystals, Kessler. xxix, 250—preparation, Stuart, (fluorspar, gypsum, sulph. ac.) xxi, 150, 280—vessels, Floord (gutta percha bottle with burette) xxiii, 33.
- **HYDROFLUOSILICIC**, (absorb in hot water, add alc.; may be kept in glass), Stolba. xxiv, 221.
- **HYDROPLATINOCYANIC**, Friswell and Greeaway. xxvi, 373.
- **HYDROPOLYPHORIC**, Stahlschmidt. xxvii, 477.
- **HYDROSULPHUROUS**, Schützenberger. xviii, 225.
- **HYPOCHLORIC**, Schachert and Fürst. xxix, 248.
- **HYPOCHLOROUS**, Kopfer. xxiv, 217.
- **HYPONITROUS** (sod. amalg; nitrite pot.), Plaats. xxvii, 295, 6.
- **HYPOPHOSPHORIC** (PO_4) (hypophosphate lead, sulph. hydrog.) Sulzer. xxvi, 360.
- **HYPOPHOSPHOROUS**, cryst., Thomsen. xxiii, 253—supposed poisonous, Markoe, Squibb, xxiv, 626.
- **HYPORUTHENIC**, Matthey. xxvii, 375.
- **HYPOSULPHUROUS**, test (chlor. ruthen.; iod. starch; permang. pot.), Haugk. xxvii, 302.
- **IGASURIC**, is really an iron—greening tannin, Höhn. xxi, 364—is only an impure gallic acid, Winckler (1831). xxi, 364.
- **IODIC**, act. of pyrogallie ac., Jacquemin. xxii, 182—estimat. in nitr. ac. (starch, sulph. hydr.). Bills. xxv, 247—preparation, (iod., or iodide and chlor. lime) Reichardt. xxiii, 250; (iodate bar., sulph. ac.), Stevenson. xxvi, 356.
- **IDO-ARSENIC**, prep., Zinno. xxii, 204—must be a mistake, Wegner. xxiii, 302.
- **IODOSTEARIDENIC**, fr. ricinoleic ac., Claus and Hassencamp. xxv, 283; xxvi, 501.
- **ISATROPIC**, Ladenburg. xxix, 322.
- **ISETHIONIC**. xxx, 342.
- **ISOBUTYLFORMIC**, constit. and salts, Schmidt and Sachtleben. xxvii, 454, 5, 7.
- **ISOBUTYRIC**, inverting power on sugar, Behr. xxvi, 517.
- **ISOTARTARIC**, (tart. and boric ac.) Dure. xviii, 259.
- **ISOVALERIANIC**, constit. and salts, Schmidt and Sachtleben. xxvii, 454, 5, 7.
- **ISOXYLIDINIC**, fr. toluol-disulph. ac., Seehofer. xxi, 318.
- **JERVIC**, fr. Veratr. alb., Weppen. xxi, 207, 364.
- **KINIC**, found in Gaultheria punctata and leucocarpa (Japan), de Vrij. xxi, 223—yields iodoform, Hager. xxx, 346.
- Acid KINOIC** (cinchona-bitter) prop. xxx, 394.
- **LACTIC**, commercial, up to standard, Rice. xxii, 257—yields a trace of aldehyd with bichr. mixt., Staedeler. xxvii, 398—drug market. xxi, 427—hypnotic, Jeruselinsky. xxv, 294—inverting power on sugar, Behr. xxvi, 517—yields iodoform, Hager. xxx, 346—suppresses therap. act. of podophyllum, Schafer. xx, 225—preparation fr. grape or invert. sugar by pot. or soda, Kiliani. xxx, 390; fr. any of the sugars and dextrines in pres. of hog's stomach, Maly. xxiii, 378—in washwater of starch, Thenius. xxvii, 459.
- **LEGUMIC**, Ritthausen. xix, 236.
- **LEVULINIC**, fr. paper, pinewood, carrag. moss by sulph. ac., Bente. xxiv, 337—fr. Helianth. tuberos., Dieck and Tollens. xxviii, 147—fr. rock candy, inulin, sulph. ac., Grote and Tollens. xxiv, 337—fr. various sugars, Tollens. xxix, 311.
- **IGNO-SULPHURIC**, Gintl. xviii, 272.
- **LOBELIC**, Lewis. xxvi, 223.
- **LUTEIC**, fr. Euphorb. cyparissius, Höhn. xxi, 393.
- **LUTEINIC**, fr. Euphorb. cyparissius, Höhn. xviii, 285.
- **MACALLO-TANNIC** (fr. macallo bark, Central America), Donde. xxviii, 400.
- **MAZENIC**, act. principle of corn silk, Vauthier. xxix, 121.
- **MALEIC**, fr. succinic ac., Bourgoin. xxii, 257.
- **MALIC**, inverting power on sugar, Behr. xxvi, 517—yields no iodoform, Hager. xxx, 346—separation fr. oxal., citr., tart. ac. (as lead salt), Harsten. xxiii, 379—synthesis, fr. fumaric acid, Lloyd. xxvii, 468—test, bichr. pot. mixture, Papazougli. xxvi, 544; xxx, 379.
- **MALONIC**, fr. monochlor-acetic ac., Bourgoin. xxix, 315—fr. trichlorolactic ac., Pinner and Bischoff. xxix, 315.
- **MECONIC**, is dibasic, Dott. xxix, 315—act. of ferric chlor., Brown. xxvii, 486—color react. with iron destroyed by phosphates; phosph. ac.; oxal. ac., Dupré. xxiv, 336—yields iodoform, Hager. xxx, 346—double salts, Rennie. xxix, 315.
- **MELLITIC**, fr. carbon and permang. pot., Schulze. xxi, 361.
- **METACOPAIWIC** of German trade is fr. Gurjun bals., Brix. xxx, 242.
- **METAPLECTIC** (fr. beets) Fremy, is arabin, Scheibler. xxii, 104, 245.
- **METATARTARIC**, prep., Hager. xxiii, 383.
- **METHIN-TRISULFONIC**, Krause. xxii, 259.
- **METHYL-CROTONIC**, identical with tiglinic ac., Schmidt and Berendes. xxvi, 502; xxvii, 433—ident. with cevadic ac., Wright and Luff. xxvi, 595.
- **METHYLETMYLACETIC**, constit., Schmidt. xxvii, 454.
- **MEZERIC**, Buchheim. xxii, 101.
- **MINERAL**, C. P., commercial, examin., Bedford. xxii, 429; xxiii, 44—decrease of spec. gr. not advisable, Bedford, xxiii, 661—test for free: sol. acet. iron, Spence and Esilman. xxvii, 303; colchicia, Flückiger. xxiv, 364; ferroc. pot., molybd. am.; Huber. xxvi, 351.
- **MOLYBDIC**, and arsenic acid compound, Debray. xxiii, 299—estimat. (permang. pot.), Pisani. xxii, 255—value of blue sol. as reagent, Maschke. xxvii, 358—test, (Schönn's sulph. ac. react. modif.) Maschke. xxvii, 359.
- **MONGUMIC**, Dragendorff. xxvii, 171.
- **MONOACETYSANTONIC**, Sestini. xxiv, 377.
- **MONOBOROTARTARIC**, Dure. xviii, 259.
- **MONOBROMDIOXYBENZOIC**, Barth and Seehofer. xxi, 360.
- **MONOCHLORANGELACTIC**, fr. crotonchloralcy-anhydrid, Pinner and Bischoff. xxiv, 293.
- **MONOMETHYLPARABANIC**, fr. theobromin, Maly and Bücheregger. xxix, 345.
- **MONOMETHYLPROTocatechuic**,—vanillic ac., Tiemann. xxiv, 380.
- **MONOPHENYLBORIC**, Michaelis and Becker. xxx, 350.
- **MUCIC**, yields no iodoform, Hager. xxx, 346.

- Acid MURIATIC**, act. upon volat. oils, Ommen. xxiv, 277; act. of ozone, Houzeau. xxi, 271; act. upon resins, gum-resins, bals., Hirschsohn. xxvi, 455; act. upon starches and arrowroot, Calmberg. xxiv, 125, 6; act. upon terpenes, Tilden. xxviii, 261—as antiseptic, Sieber. xxviii, 90—freed fr. arsenic (protochlor. tin) Bettendorff. xviii, 220; (charcoal) Skey. xxvi, 364—in California. xxvii, 619—contamin. with selenium, Schlagdenhauffen. xxvi, 353; with bromine, Wittstein. xix, 184; with chlor. lead, Scheffer. xxiv, 217, 411—crystall. hydrate (mur. ac. gas into freezing ac. mur.), Pierre and Puchot. xxiv, 216—detect. of arsenic, Hager. (Bettendorff's protochlor. tin test) xix, 184; (drop on tinfoil and heat) xxviii, 248; Oster (tinfoil test). xxi, 277; of arsenic and sulphurous ac. in one operat. (am-chlor. cop., nitr. silv.), Ziegler. xxix, 247; (subac. lead, nitr. silv.), Ph. Germ. xxi, 277; (iodine, nitr. silv., chlor. bar.), Hilger. xxiii, 245—drop equivalent, Talbot. xxix, 34—dry gaseous (heat mur. ac. with chlor. calc.), Solvay. xxix, 246; xxx, 271; (sulph. ac., dry chlor. ammon.), Koninck. xxix, 246—constant generator, Kämmerer. xxv, 54—inverting power on sugar, Behr. xxvi, 517—normal, prep. (Iceland spar), Duerr. xxii, 188—pure: fr. chlor. calc., sulph. magnes., or chlor. and sulph. magn., Eschellmann. xxx, 271; fr. chlorine and charcoal. xxi, 273; fr. crude by chlorin. lime and salt of tin, Lettnow. xxi, 276; fr. crude by sulph. hydrog., fractional distill., Dietz. xxi, 276—test for free, in chlor. iron sol. (carbolic ac.), Reale. xxviii, 221.
- **MYRIOGYNIC**, Müller. xxvii, 282.
- **MYRONIC**, in East Indian rapeseed, Ritthausen. xxx, 394.
- **NICOTINIC**, Weidl. xxi, 384—ident. with carbopyridinic ac. of Huber, Weidl. xxi, 366; Laiblin. xxviii, 343.
- **NIINIC**, fr. niinfat, Blöde. xix, 312.
- **NIOMIC**, constit., Joly. xxiv, 254.
- **NITRIC**, act. of nasc. hydrog., Bourgoin. xix, 179; act. upon cop., zinc, merc., silv., Acworth. xxiv, 209; act. of metals, (nature of gases,) Acworth and Armstrong. xxvi, 343; act. of acid stannous chlor., Dumreicher. xxix, 242—in California. xxvii, 619—spontan. combust. caused, Kraut, Haas. xxix, 242, 3—commercial always cont. iodine, Marquart. xxiv, 230—detect. of iodic ac. (starch, sulph. hydr.), Bills. xxv, 247; of iodine, (bisulph. carb.), Hilger. xxiii, 240—estimation: ac. stannous chlor., Dumreicher. xxix, 242; (in nitr. sod.) oxal. ac., Hager. xviii, 219; as ammon. (by nasc. hydr.), West-Knight. xxx, 263—inverting power on sugar, Behr. xxvi, 517—found in potable water (fr. fossils), Ekin. xix, 179—preparation: conc. fr. nitr. and sulph. ac., Trimble. xxvi, 343; fr. ammonia (over mangan. sod.), Schwarz. xxiv, 210—stains removed (permang. pot., sulphurous ac.). xxiii, 241—synthesis, (electric spark and air). xxx, 263—tests: brucia, Reichardt and Kers-ting. xix, 180; Boettger. xxiii, 420; carbol. and sulph. ac., Lindo. xxvi, 343; diphenylamin, Martin. xxvi, 342; xxx, 472; mur. ac. and gold leaf, Vogel. xxiv, 209; (in pres. of nitrous ac.) urea, Piccini. xxviii, 216.
- **NITRIC, ANHYDROUS**, can be heated in gaseous state without decomp., Lunge. xxvii, 299—preparation: Berthelot (dist. with powdery phosph. ac.). xxiii, 240; Odet and Oignon (chlorinated nitr. ac. and nitr. silv.) xix, 180.
- **NITROBENZOIC**, Fittica. xxvi, 535.
- **NITROMURIATIC**, drop equivalent, Talbot. xxix, 34.
- **NITROPHENIC**, in alkalimetry, Langbeck. xxix, 241.
- **NITROPOLYPORIC**, Stahlschmidt. xxvii, 477.
- **NITROSALICYLIC**, Phipson. xxvi, 544—three isomeric acids, Hall. xxiv, 326.
- **NITROUS**, prep. fr. air by ammon. copper, Loew. xxvii, 356—tests: diphenylamin, Martin. xxvi, 342; rosaniline, Jorisson. xxx, 262; sulphani-lic ac., sulph. naphthylamin, Gries. xxvii, 296; only practicable with dilute sol., Preuss and Tiemann. xxvii, 296; diamidobenzoic
- Acid (Continued.)**
- ac., Gries. xxvi, 341; metadiamidobenzol, Gries. xxvi, 341.
- **OENOTANNIC**, Gautier. xxvi, 556.
- **OLEIC**, for isolat. alkaloids, Wolff. xxvii, 478—pure, prep: Berthelot. xxii, 461; Bromeis. xxii, 461; Frederickson and Hart (oil of almonds). xxi, 347; George (soap, sulph. ac., litharge). xxx, 359; MacLagan, (oil almonds). xxi, 349; Rice (freezing, sulphurous ac.). xxii, 460; xxiii, 356; Varrentrap. xxii, 461; Wolff (lead plaster, benzin). xxv, 282; xxvii, 429—separation fr. stearic ac. (glac. acet. ac.) David. xxvii, 427.
- **OPHELIC** (fr. chiretta), Höhn. xviii, 278; xix, 287.
- **OPIANIC**, history. xxi, 373—account, Wright and Beckett. xxvi, 564.
- **ORGANIC**, act. of air (decomp.) Werner. xxli, 249.
- **ORTHO-NITRO-PHENYL-PROPIOLIC** (= commercial propiolic ac.). xxx, 445.
- **ORTHO-PHOSPHORIC**, crystals, Cooper. xxx, 280.
- **OSHAIC**, Haupt, Jr. xxli, 125.
- **OXALIC**, convers. into carbon. oxide, Chevrier. xix, 181; in solut. oxidized by air, Bizio. xviii, 251; xix, 182; Werner. xxii, 249—act. of light on solut. (decomp.), Downes and Blunt. xxvi, 548—drug market. xx, 119; xxi, 427; xxii, 621; xxiv, 397; xxv, 351; xxvi, 652; xxvii, 556, 560; xxx, 463—fluidvolume, Candidus. xxvii, 709; xxviii, 420—found in fungi, Hamlet and Plow-right. xxvi, 177—inverting power on sugar, Behr. xxvi, 517; yields no iodoform, Hager. xxx, 346—preserves aq. sol. of ozone, Jeremin. xxvii, 290—is poisonous; experiments with dogs are fallacious, Pfeiffer. xxviii, 303—preparation: fr. madder root, Pernot. xviii, 251; as by-product of act. of mur. ac. and chlor. pot. on organ. subst., Melckebeke. xxvii, 450; fr. paraf-fin oil (by nitr. ac.), Galletly and Thomson. xxx, 379; fr. sawdust (soda alone is not suff.), Thorn. xxiii, 385—pure (fr. oxalate pot., chlor. magn.), Bohlig. xxvi, 548—purified: absol. alc., Haberdank. xxi, 361; fract. cryst., Siebold. xxiv, 337; mur. ac., Stolba. xxiii, 385—solubil-ity in alcohol, Candidus. xxx, 564; in water, Nichols. xix, 182—synthesis (carbon. ac. and sodium), Drechsel. xviii, 251.
- **OXALIC, ANHYDROUS**, crystals, Villiers. xxix, 312.
- **PARACOTOINIC**, Jobst and Hesse. xxviii, 202.
- **PARAFFINIC**, Pouchet. xxiii, 387.
- **PARALACTIC**, fr. sugar, Maly. xxiii, 378.
- **PARAOXYBENZOIC**, fr. benzoic ac., pot., Barth. xxi, 360—fr. carbol. pot., carb. ac., Kolbe. xxiii, 375—fr. glycyrrhetin, Weselsky and Ben-edikt. xxv, 316.
- **PARASACCHARIC**, fr. glycyrrhizin, Habermann. xxix, 352.
- **PARCHMENT PAPER**, (4 sulph. ac., 1 water). xxiv, 338.
- **PARIETINIC**, ident. with chrysophanic ac., Lindsay. xxv, 65.
- **PATELLARIC**, fr. *Parmelia scruposa*, Weigelt. xix, 263.
- **PAULLITANNIC**, fr. guarana, Greene. xxvi, 269.
- **PEROMIC** for staining microsc. obj., Boericke. xxvii, 60.
- **PERRUTHENIC**, Deville and Debray. xxvi, 428.
- **PERSULPHOCYANIC**, Atkinson. xxvi, 371.
- **PERSULPHURIC**, (electrolysis of sulph. ac.), Berthelot. xxvi, 349; xxviii, 216.
- **PHLORETIC**, Schiff. xxiii, 439.
- **PHOSPHATES**, Shinn. xxix, 76.
- **PHOSPHATES COMP.**, Shinn. xxix, 76.
- **PHOSPHATICUM**, (chiefly phosphorous acid), Maisch. xxx, 653.
- of **PHOSPHORUS**, constit., Rother. xxiv, 223.
- **PHOSPHORIC, CRYSTALL.**, Cooper. xxx, 280; Kramer. xviii, 226; Markoe. xxiv, 625.
- **PHOSPHORIC, GLACIAL**, Squibb. xx, 66—aduk. (phosph. sod.) Markoe. xxi, 511—p. c. of sod phosph., Prescott. xx, 259; Dohme. xxiii, 666 674.
- **PHOSPHORIC, SYRUPY**, fr. glacial, Rother. xxi 282—suggested, Remington. xxiii, 677.

Acid PHOSPHORIC, DILUTED, color and odor react. with alkaloids, Nowak and Kratschmer. xxii, 262—as antiseptic, Sieber. xxviii, 90—contamin. with arsenic, Thompson. xxii, 313; Ph. Germ. (72) test for arsenic not reliable, Sarrazin. xxiii, 254—is a monobasic ac. of a mixed function, Berthelot and Longuinine. xxiv, 224—discussion. xxii, 511; xxx, 652—estimation: neutr. cryst. bism., Benoit. xxiv, 224; ammon. sol. magnes., Parnell. xxiv, 224; as silver phosph., Perrot. xxx, 279; Liebig's test, subst. sulphocy. pot. for ferrocyl., Stoddart. xxiii, 254—cause of precip. ferric chlor., Dohme. xxii, 431; xxiii, 255; Remington. xxiii, 670, 813—found in Swedish filt. paper, Uelsmann. xxv, 44—fungoid growth, Jensen. xxviii, 228—inverting power on sugar. Behr. xxvi, 517—act. upon metallic salts, Morgan. xxv, 247—sign of absence of nitric ac. (pure white bubbles), Wenzell. xxx, 561, 2; get rid of nitric acid (alcohol), Lloyd. xxx, 652; (starch; sugar; oxalic ac.) Markoe. xxx, 652—preparation: Bedford, (brom. proc., details). xxiv, 225; Dohme (fr. glacial). xxiii, 662; xxiv, 225; Lehn, (iodine). xxix, 252; Lloyd, (U. S. distill.) xxix, 252; Markoe (bromine). xxiii, 677, 680, 683, 810; xxiv, 225; xxx, 653; Mattison, (phosph. amorph.) xxv, 248; Pile, (mishap; brom.) xxiv, 225; Prescott (U. S. Ph.) xxiv, 225; Remington (glac.; recommends syrupy). xxiii, 670; xxiv, 225; Rieckher, (phosph.) xix, 195; Scheibler (fr. superphosph. calc., sulph. ac., no distill.) xxiii, 253; Shuttleworth (U. S. Ph., superior to Brit. Ph.) xxi, 133; (precaut. with strong nitr. ac.) xxiv, 226; Squibb (pract. hints, U. S. Ph.) xxiv, 603; Thompson, (fr. glacial without nitr. ac.) xxii, 512; Wenzell (phosph., moist air). xxx, 556—contam. with phosphorous ac. detect., (corr. subl.) Rieckher. xix, 195; with pyrophosph. prevented, Dohme. xxiii, 662—review, Diehl. xxiv, 40; Graham. xxiv, 602—as preservative, Endemann. xxviii, 228—pure (fr. phosph. sod., mur. ac.) Ditte. xxix, 251—separation in anal. fr. lime, alum, iron (chlor. magnes.), Ville. xxi, 281—test in minerals (sodium), Bunsen. xviii, 226.

— **PHOSPHOROUS**, estimat., (corr. subl.), Prinzhorn and Precht. xxiv, 223—cryst. (heat bichl. ph. and collect in ice water), Grosheinz. xxvi, 359—preparation (lead phosphite, sulph. hydrog.), Corne. xxvi, 360—test (in phosphoric acid: corr. subl.), Rieckher. xix, 195.

— **PHOSPHO-TUNGSTIC**, Schering. xxi, 308—as tests for alkaloids, Schering. xxi, 369.

— **PHYTOLACCIC**, Terreil. xxx, 160.

— **PICRIC**, compound with acet. ac., Tommasi and David. xxii, 259—coloring power, Küpfer. xxiv, 382—detect. in beer (woolen yarn; cyan. pot.), Brunner. xxii, 259; Dragendorff. xxx, 340; Wittstein. xxiii, 340—prep. fr. acaroid resin, Wittstein. xxiv, 338.

— **PIMARIC**, constit., Bruylants. xxvi, 466.

— **PINALIC**, Friedel and Silva. xxii, 251.

— **PIPERINIC**, act. of permangan. pot., Fittig and Mielck. xviii, 260.

— **PIPERONYLIC**, fr. coto bark, Jobst and Hesse. xxvii, 281—fr. para-coto bark, Jobst and Hesse. xxviii, 203.

— **PIPIZAHUIC**, prop. xxiv, 797.

— **PODOCARPINIC**, Oudemans, Jr. xxii, 253.

— **PODOPHYLLIC**, Podwyssotski. xxix, 191.

— **PODOPHYLLINIC**, Buchheim. xxii, 125—Power. xxv, 433.

— **POLYPORIC**, Stahlschmidt. xxvi, 177—act. of re-agents, Stahlschmidt. xxvii, 477.

— **PROPIONIC**, best prep. fr. lactic ac. (62 p. c.), Freund. xxi, 359—fr. propyl. alc., Pierre and Puchot. xxii, 256—fr. propionitril, sulph. ac., Backunts and Otto. xxvi, 532—destruct. dist. of wood, Barre. xviii, 259; xix, 221.

— **PROTocatechuic**, in podophyllum, Power. xxv, 427, 433—does not pre-exist in podophyllum, Power. xxvii, 205.

— **PROTocatechuic**, CARBOXYLATED (hemipinic ac.). xxvi, 564.

— **PYRO-CATECHUIC**, in resin of bals. peru, Kähler. xviii, 284—in Dikamali resin, Flück-

Acid (Continued).

iger. xxv, 164—in berries of *Ampelopsis hederacea*, Gorup-Besanez. xxii, 138.

— **PYROGALLIC**, as antiseptic, Bovet. xxviii, 317—yields coerulein, Baeyer. xix, 222—not decomp. by the air, Werner. xxi, 249—decomposes peroxide hydrog., Struve. xxii, 261—act. of oxidizing agents, Struve. xxii, 260—poisonous, Personne. xxiii, 293—prep. fr. gall. ac. and glyc., Thorpe. xxix, 324—solub. in alc., Candidus. xxx, 564—stable solut. (salicyl. ac.), Wortley. xxx, 399—distinct. fr. tannin and gallic ac., Watson. xxvii, 473—therapeutic value, Vesey and Husemann. xxvii, 473.

— **PYRO-GENTISIC**, Hlasiwetz and Habermann. xxiv, 373.

— **PYROLIGNEOUS**, cont. other volat. ac., Barre. xviii, 255.

— **PYRO-TARTARIC**, normal, Rebout. xxiv, 336.

— **QUEBRACHITANNIC**, Arata. xxx, 398.

— **QUININIC**, is alc. or phenol. of lepidin, Skraup. xxviii, 326.

— **QUINOVIC**, estimat., de Vrij. xxii, 257—prop. xxx, 394.

— **REGIANIC**, fr. walnut rind, Phipson. xix, 293.

— **RHATANIA-TANNIC**, is not a glucoside; prep., Raabe. xxix, 323.

— **RICINOLEIC**, convers. into stearic ac., Claus and Hassenkamp. xxv, 282; xxvi, 501.

— **ROSOLIC**, as test for free carbon. ac., Pettenkofer. xxiv, 231.

— **RUFIGALLIC**, yields alizarin, Widmann. xxiv, 384.

— **RUTHENIOUS**, Deville and Debray. xxvi, 428.

— **SACCHARIC**, fr. glucose, Reichardt. xix, 257.

— **SACCHARO-VANILLIC**, Tiemann and Reimer. xxiv, 380.

— **SALICYLIC**, compound with albumenoids and iron, Farsky. xxvi, 539—antiseptic and preservative, Case. xxv, 294; Kolbe and Knop. xxiii, 375; thrice as powerful as alc., Godeffroy. xxiii, 377; compared to benzoic ac., Trimble. xxv, 290; Thresh and Wagner. xxiv, 325—artificial: fr. benzoate copper. xxiii, 747; fr. caffeol, Bernheimer. xxix, 165; fr. oil *Andromeda Leschenault*. xxv, 291; fr. oil wintergreen, Lloyd. xxiv, 323; xxvii, 464; xxviii, 310; fr. phenol, sod. sulphhydr., Bong. xxviii, 311; fr. sod. carbol., Kolbe. xxiii, 374; xxv, 463; xxvii, 463; Diehl. xxiii, 345, 7; xxvi, 41; not exactly identical with natural, Williams. xxvi, 536—and borax, Jahns. xxvi, 538; bitter taste, Thresh. xxv, 292—for children, Wunderlich and Maury. xxiv, 85—detect. of carbol. ac. (am., chlorinat. soda), Almén. xxv, 292—red color removed by glyc., Thresh. xxiv, 323—dialyzed (always has up to 10 p. c. impur.), Squibb. xxv, 549—dispensing in mixt. (tragac.), White. xxv, 294; (conc. am. acet. sol.), Diehl. xxv, 532—drug market. xxv, 351; xxvii, 573; xxviii, 368; xxix, 370; xxx, 463—estimat. (sulph. ac., ether), Hager. xxvi, 538; Rémont. xxx, 388; (bisulph. carb), Roessler. xxx, 222—extract fr. aq. acidul. sol. by benzol, Dragendorff. xxvi, 86—act. of glucose and sulphuric ac., Phipson. xxii, 252—found in *Gloriosa superba*. xxx, 151; in root of *Polygala paucifolia*; in *Viola tricolor*, Mandelin. xxviii, 173; xxx, 234—history, uses, etc., Squibb. xxiii, 378—impurities, Squibb. xxx, 387—to replace litmus in titrat., Weiske. xxiv, 323—is not entirely innocuous, Heintz. xxiv, 325—yields no iodoform, Hager. xxx, 346—more delicate test for iron than sulphocy., Vogel. xxiv, 324; react. prevented by several salts, Hager. xxviii, 312—medical uses, Mattison. xxv, 465—pharm. prep., Maury. xxiv, 325; Mattison. xxv, 464—in pills (borax, glyc.), White. xxv, 294—preparation, see artificial—purity, test (conc. sulph. ac.), Hager. xxv, 291; (crystals f. alc. sol.), Kolb. xxv, 291, 463; Heyden. xxvii, 464—purificat.; (sublim. with superheat. steam), Rautert. xxiii, 376; (fr. calc. salt by mur. ac.), Williams. xxvi, 537; (by dialysis) xxv, 291—solubilities, Bourgoin. xxvii, 463; xxviii, 310; Becker. xxv, 293, 4; Mattison. xxv, 461; in alcohol, Candidus. xxx, 564—solution: acet. ammon. sol., Hays. xxv, 471; Painter. xxiv, 81;

Acid (*Continued*).

- citr. pot., Thresh. xxv, 292, 293; am. phosph., Toussaint. xxiv, 323; sod. phosph., Rossnyay. xxiii, 377; glycerin, Müller. xxiv, 80; borax, glyc., Mitchell. xxv, 293; water, glyc., Vogel. xxiv, 324; effect of salts, Hays. xxv, 465—sources, Mattison. xxv, 461—sublimed the purest, Squibb. xxv, 549, 552; deteriorates quality, Biel. xxiv, 326; dialyzed is the cheapest to sublime, Squibb. xxv, 551—synthetical, see artificial—tests: sulph. copper. xxviii, 311; ferric chlor., Hager. xxviii, 311; in urine (ferric chlor.), Siebold, Bradbury. xxx, 388—for preserving test solutions, Mohr. xxiii, 378.
- SALICYLOUS, Diehl. xxiii, 746—found in flowers of *Crepis foetida*; *Chrysomela populi*. xxiii, 746. See also ALDEHYD, SALICYLIC.
- SALYLIC (Kolbe and Lautermann) is impure benzoic ac., Kolbe. xxiv, 322.
- SANGUINARINIC (Newbold) is a mixt. of citr. and mal. ac., Hopp. xxiii, 203.
- SANTONIC, act. of chlor. acetyl, Sestini. xxiv, 379—prop., Hesse. xxiii, 386—account, Cannizara and Sestini. xxii, 280.
- SARKOSINIC, in shellac fr. Mexico (gum Sonora), Herz. xxiv, 203, 338.
- SCLEROTIC, Dragendorff and Podwissotski. xxvi, 549—therapeut. value and dose, Nikitin and Ziemssen. xxviii, 317—as substit. for ergot, Witte. xxv, 321; xxix, 370—stable when dry, Witte. xxv, 321.
- SELENIC, Gerichten. xxii, 171.
- SENTYLIC (- normal val. ac.), constit., Schmidt. xxvii, 454.
- SILICIC, soluble in aq. ammon., Pribram, Sonchage. xxi, 282—precipitants, Flückiger. xviii, 232.
- SILICO-MOLYBDIC, Parmentier. xxx, 302.
- SILICO-PROPIONIC, Friedel and Ladenburg. xix, 196.
- SILICO-TUNGSTIC as test for alkaloids, Godefroy. xxv, 31, 262.
- SPIROILOUS, see ALDEHYD, SALICYLIC.
- STEARIC, adult. (paraffin). xxi, 503—decompos. prod. by dist. under pressure, Johnston. xxiv, 303—found in *Achillea moschata*, Planta. xxix, 159—separat. fr. oleic ac., David. xxvii, 427—dissolves phosphorus, Vulpius. xxvii, 313; sulphur, Vulpius. xxvii, 301—prep. fr. ricinoleic acid (by nasc. hydrog. iodide and hydrog.) Claus and Hassencamp. xxv, 283; xxvi, 501; fr. raw fatty acids by bisulph. carb., Deiss. xxii, 243; benzin better, Heeren. xxiii, 357. See also STEARIN.
- STEOCAROBIC, Peckolt. xxx, 177.
- SUCCINIC, decomp. by air, Werner. xxii, 249—estimat. in amber, Helm. xxvi, 469—found in bark of *Morus alba*, Gmelin; Goldschmidt. xxx, 393; in unripe grapes, Brunner and Brandenburg. xxv, 295—inverting power on sugar, Behr. xxvi, 517—yields no iodoform, Hager. xxx, 346—converts. into malic ac., Bourgoin. xxii, 257—solubility, Bourgoin. xxiii, 379; xxiv, 327—test (bichrom. pot.) Papazoglou. xxx, 379.
- SULPHHYDRIC. See HYDROGEN, SULPHURETTED.
- SULPH-INDYLIC. xxiv, 715.
- SULPHOCARBOLIC, Guy. xviii, 249; Prescott. xix, 550; Rother. xxi, 340—contains uncombin. sulph. ac., Hager. xviii, 249—test, (nitr. ac., heat) Prescott. xix, 550.
- SULPHO-LIGNIC (Braconnot) fr. collodion cotton, Gintl. xix, 261.
- SULPHO-METHYLIC, Rabuteau. xxvii, 411.
- SULPHO-PARABENZOIC, Kölle. xxi, 361.
- SULPHO-PHENIC. See ACID SULPHOCARBOLIC.
- SULPHOVINIC, theory and constit., Berthelot. xxi, 329.
- SULPHURIC, adult. (sulph. sodium), Fleischer xviii, 224; (sulph. magn.) xix, 340—contamin. with sulph. lead xix, 340—and alcohol, act. upon several spices, Doliber. xix, 444—as antiseptic, Sieber. xxviii, 90—apparatus for conc. (pumice stone, ascending hot air), Cotelle. xviii, 224; xix, 139; use of Sprengel atomizer. xxiv, 213; still, Favre and Kessler. xxiv, 214—

Acid (*Continued*).

- detect. of arsenic, (one kilo at least must be examined) Selmi. xxviii, 217—freed fr. arsenic (charcoal), Skey. xxvi, 364; (hyposulph. bar.) Wagner. xxiv, 215; (hyposulph. ac.) Thorn. xxiv, 214; (sulphide bar.) Dupasquier. xxiv, 215; (chlor. lead), Selmi. xxix, 243; (sulphide sod.), Smith. xxiv, 214—boiling point, Lunge. xxvii, 302—burns (calc. magn., water), Alanose. xxix, 244—in California. xxvii, 619—in Canada. xxv, 339—distill. without bumping (cokes), Raoult. xxiii, 242—estimation in water (baryta; carbon. ac.), Haubst. xxvi, 348, 9; in sulphates (chlor. bar., chrom. pot.), Wildenstein. xxviii, 217; Precht. xxviii, 217—freezing point, Lunge. xxx, 267—gases evolved on contact with org. subst., Vohl. xxiii, 242—hydrog. reduces to sulphurous, Werner. xxii, 177—inverting pow. on sugar, Behr. xxvi, 517—detect. of nitrous ac. (diphenylamin), Scheurer-Kästner. xxix, 244; estimat. of nitrogen compds. (mercury column), Davis. xxvi, 347—manufacture: action on platinum vessels, Scheurer-Kästner. xxiv, 214; xxvi, 349; (only in presence of nitrogen compds.) xxix, 243; fr. gypsum (carb. am.), Reinsch. xix, 194; fr. sulph. sod. (boric ac.), Degen. xxix, 245; fr. sulphurous ac. (ozone), Langlois. xix, 194—fr. sulphurous ac., air, heat, Houzé. xxix, 243; theory of manuf., Lefort. xix, 192—product. in Europe, Gaudron. xxii, 35—pyrites, statistic, in France, Girard and Morin. xxiv, 212—act. upon resin, gum-resins, bals., Hirschsohn. xxvi, 456—spec. grav., Kohlrausch. xxvi, 347—structural diff. caused by temp., Mauméré. xxiv, 215—test in vinegar (chr. lead, pot. iod., bisulph. carb.), Donath. xxviii, 212—transport. in iron vessels feasible, Balmain and Menzier. xix, 194—volatile at ordinary temp. xxx, 267.
- SULPHURIC (H_2SO_4 , $3SO_3$), Weber. xxvi, 346.
- SULPHURIC, ANHYDROUS, fuming (bisulph. sod., sulph. magn.; dist.), Walter. xxvii, 302—on large scale in Bohemia. xxvi, 346—prop., Weber. xxvi, 346.
- SULPHURIC, FUMING, cryst., is explosive, Stoelzel. xxviii, 216.
- SULPHURIC AROMATIC, preparation: Doliber (oil cinn.). xix, 444; (extempore) xix, 445; Fairthorne (extempore). xxix, 60; Huglan (oil cinn.). xxviii, 40; Jamieson (tinct. ging., oil cinn.). xxviii, 40; Markoe (percol. with acid and alc.). xxi, 514; Ehrmann (rose, orange). xix, 148; Whittier (oil cinn.; rose) xxiii, 43.
- SULPHUROUS, for increasing prod. of alc. in mash, Beanes. xix, 193—drop equivalent, Talbot. xxix, 34—to treat bones for fertilizers, Garland. xxi, 140—as disinfectant, Gamgee. xix, 193—manufacture, sulphuric ac. of 74 p. c. is best, Scott. xviii, 223—p. c. table, Scott. xviii, 224—and carbonic oxide for preserving meat, Gamgee. xix, 193—in sick rooms, bisulphide carb. in a coal oil lamp, Keat. xxv, 250—solub. in alc., Gamgee. xix, 193—test, Ph. Germ. (cotton—acet. lead), the cotton must be pure, Schlickum. xxx, 267.
- TAMPICIC, Spirgatis. xix, 288.
- TAMPICOLIC, Spirgatis. xix, 288.
- TANACETIC, Merletta. xxi, 226, 365—existence denied, Leppig. xxx, 191.
- TANNIC, see TANNIN.
- TANTALIC, constit., Skey. xxiv, 254.
- TARTARIC, adult. (50 p. c. sulph. magn.) xix, 340; xxii, 313—commercial quality, Rose. xxi, 651—contaminated with lead (always), Mirus. xviii, 260; Klingelhöfer. xxi, 500; Rice. xxi, 500; with sulph. ac., Remington. xxi, 90; xxii, 313; Williams. xxiv, 542—decomposed by air, Werner. xxii, 249—drug market. xix, 394; xx, 118; xxi, 427; xxii, 621; xxvi, 653; xxvii, 556, 560, 568, 573; xxviii, 368; xxix, 370; xxx, 464—estimat. in dregs of wine, Dotto-Scribani. xxvii, 469; Fleischer. xxiii, 380; Scheurer-Kästner. xxvi, 545; Warrington. xxiii, 383—fluid volume, Candidus. xxvii, 709—inverting power upon sugar, Behr. xxvi, 517—yields no iodoform xxx, 346—manufacture, Warrington. xxiv, 328, 333; in U. S. xxviii, 314—mould pre-

Acid (Continued).

- vented by filtering and boiling, Wood. xix, 226—phosphorescent. xix, 220—preparation fr. mother-liquors, Dieterich. xxix, 316; fr. wine lees, Müller. xxvi, 545; chemically pure fr. tartrate of zinc, Ficinus. xxvii, 468—solub. in alc. Candidus. xxx, 564; in ether, Nessler. xxviii, 312—synthesis, fr. artif. succinic ac., Jungfleisch. xxi, 362—test in citric ac. (bichr. pot.) Cailliet. xxvi, 545; (ferrous sulph., peroxide hydrog.), Fenton. xxix, 316.
- TARTRANTIMONIOUS**, Clarke and Stalls. xxix, 318.
- TELLUROUS**, reduc. by glucose, Stoltz. xxii, 202.
- THYMIC**, prep. Phar. Soc. Paris. xxv, 273.
- TIGLINIC**, Geuther. xviii, 253—normal constit. of Roman chamomile, Fittig and Köbig. xxvi, 449—ident. with methylcrotonic ac., Schmidt and Berendes. xxvi, 502; xxvii, 433.
- TOLUOL-DISULPHURIC**, Senhofer. xxi, 318.
- TRICHLORACETIC**, fr. chloral and permang. pot., Clermont. xxi, 359.
- TRICHLORANGELACTIC**, fr. croton-chloral-cyanhydrid. (mur. ac.), Pinner and Bischoff. xxiv, 293.
- TRICHLOROLACTIC**, Pinner and Bischoff. xxiv, 292.
- TRIMETA-PHOSPHORIC** (and sixteen salts), Lindbörn. xxiv, 223.
- TRIMETHYLACETIC**, constit., Schmidt. xxvii, 454.
- TROPIC**, test (nitr. ac., potassa), Vitali. xxix, 336.
- TUNGSTIC**, Thenius. xxvii, 357.
- TUNGSTOBORIC**, Klein. xxx, 302.
- TURPENTINE-PHOSPHOROUS**, Köhler and Schimpf. xxi, 281, 323.
- URIC**, act. of ammon—copper, Loew. xxvii, 356; of metallic ferricyanides, Bong. xxvi, 369—estimat. (fuming mur. ac.), Pettit. xxx, 395; precautions, Schwanert. xxi, 404—from guano, Reichardt. xxiii, 472—yields no iodoform, Hager. xxx, 346—test (murexide react. with brom. for nitr. ac.), Magnier. xxv, 331.
- UROCHLORALIC**, Musculus and Marmé. xxiv, 391.
- VALERIANIC**, differ. betw. nat. and artif., Schaer. xxiii, 372—boiling point, Schacht. xviii, 259—home made, cost, Fredigke. xx, 206—yields no iodoform, Hager. xxx, 346—preparation, fr. angelic acid, Ascher. xix, 222; fr. fusel oil (quick-vinegar process, using valer. root.), Ficinus. xxii, 251; on large scale fr. fusel oil (chrom. ac., pot.), Pierre and Puchot. xxiii, 372—purification (val. sod., sulph. ac., distil), Lescœur. xxvi, 532—test of purity (ac. copper; am., cold water), Hager. xxviii, 306.
- VALERIANIC, INACTIVE** (= isobutylformic), Sachtleben, Schmidt. xxvii, 454, 5, 6.
- VANILLIC** (efflorescence of bean) = vanillin (of Goble and Vee), Stokkebye. xxi, 366—prop., Carles. xxi, 366—fr. coniferin, Tiemann. xxiv, 380; fr. eugenol, Tiemann. xxiv, 381.
- VERATRIC** fr. apo-pseudaconitia, Wright and Luff. xxvii, 510.
- VIBURNIC**, Krämer; Mono. xxvi, 244.
- VIRIRINIC**, fr. Remigia ferruginea. xxvii, 182.
- XANTHOGENIC**, precip. albuminoids, Zöller. xxix, 358.
- YABA-TANNIC**, Donde. xxviii, 200.

Acidimetrical Indicator. See **ALKALIMETRY**.

Acolytia (Hübschmann) a decomp. prod., Wright and Luff. xxvi, 598.

Aconella, not ident. with narcotina (T. & H. Smith), Flückiger. xviii, 265.

Aconia, Wright and Luff. xxvi, 597; xxvii, 511.

Aconites, poisonous and non-poisonous, Schroff. xxiv, 157.

Aconite, ALKALOIDS, in fresh herb, Wright and Rennie. xxix, 343—account: Diehl. xxvi, 37; xxvii, 35; Flückiger. xviii, 265; xix, 228; Wright. xxiv, 355; xxvi, 595; xxviii, 336; xxix, 340; Wright and Luff. xxvi, 597; xxvii, 509.

—adult. of powd. root and leaves, Allaire. xxx, 576—cultivat. in Lincolnshire, Holmes. xxx, 210—descript., Holmes. xxv, 173—drug market.

Aconite (Continued).

- xx, 127; xxi, 440—extraction, best menstr. alc., tart. ac., Wright. xxvi, 596; acid not necessary, Wright. xxviii, 337—poisoning, Duffield. xviii, 77, 189; discussion. xviii, 77—seeds, germination, Saunders. xxx, 566—test, by biting and chewing, Squibb. xx, 229—tincture will gradually lose activity, Wright and Luff. xxvi, 599.
- ATIS** (Atees), (heterophyll.) alkaloids, Wright. xxviii, 337.
- JAPANESE**, alkaloids, Paul and Kingzett. xxvi, 599; Wright and Luff. xxvii, 511; Wright. xxviii, 337—descript., Langgaard. xxix, 173; Wasowicz. xxvii, 200; xxix, 170.
- Aconitia**, act. of sulph. ac., bichr. pot., chlorin. lime, Hamlin, Jr. xxix, 324; of sulphmolybd. am., Buckingham. xxi, 369; of ferric chlor., butt. antim., stannous chlor., Godeffroy. xxvi, 559.
- fr. **AC. NAPELLUS**, Wright and Luff. xxvi, 597; xxix, 341—derivatives, Wright and Luff. xxvii, 509—commercial, is a complex mixt., Wright and Luff. xxvi, 598—constit., W. and L. xxvi, 599—crystallization indispensable to purity, W. and L. xxvi, 598—crystallizable, Wright. xxvi, 596—estimat. (bism., pot. iod.) Thresh. xxviii, 320—hypoderm. sol., Powers. xxvii, 92—preparation: Duquesnel. xxx, 428, note; Groves. xxiii, 425; Hottot-Liégois. xxx, 428, note; Boiraux and Leger. xxiii, 425—diff. prop. of German and English, Flückiger. xix, 228; Hottot is stronger, Hager. xxiii, 426; Merck's, prop. xxx, 429; Morson's, prop. xxx, 429—soluble in fixed oils by glac. acet. ac., Barnes. xxiv, 343—relative toxic effect fr. diff. manif. (Friedländer, Merck, Pettit), Plugge. xxx, 427—yield by diff. processes, Schneider. xxx, 427, 8, 9.
- fr. **ACONIT. FERROX.**, prep., Phar. Soc. Paris. xxv, 309—ought to be subst. by nitr. pseudaconitia, Wright and Luff. xxvii, 510.
- OLEATE**, Gerrard. xxi, 348.
- (**ECLECTIC**), examin., Little. xxiv, 411; xxv, 98.
- Aconitum**, review of species, Meyer. xxx, 211.
- ANTHORA**. xxx, 211—root not poisonous, Royle. xxiv, 158.
- CHINENSE**, descript. xxix, 175.
- FERROX**. xxx, 211—descript., Wasowicz. xxix, 170—alkaloids, Wright and Luff. xxvi, 598—yields Bish. xxiv, 724.
- FISCHERI**. xxx, 211—descript., Wasowicz. xxvii, 200.
- HETEROPHYLLUM**. xxx, 211—alkaloids, Wright. xxviii, 337—yields Atees. xxiv, 724—is not poisonous; analysis, Broughton; Wasowicz. xxvii, 198.
- LYCOCTONUM**. xxx, 211—alkaloids, Wright and Luff. xxvi, 598.
- MULTIFIDUM**, is eatable, Hooker. xxiv, 158.
- NAPELLUS**. xxx, 211—alkaloids, Wright and Luff. xxvi, 597; xxix, 341.
- PALMATUM**, uses in India, Dymock. xxvi, 158.
- PANICULATUM**, xxx, 211—extract of herb is easier to make than from napellus, Cleaver. xxx, 210.
- ROTUNDIFOLIUM**, is eatable, Hooker. xxiv, 158.
- SEPTENTRIONALE**, leaves used in Lapland as pot-herb, root is poisonous, Schroff. xxiv, 158.
- STÖRCKEANUM**. xxx, 211.
- UNCINATUM**. xxx, 211.
- VARIEGATUM**, China. xxiv, 757.
- Acorus CALAMUS**, Kansas. xxix, 440. See also **CALAMUS**.
- GRAMINEUS**, Japan, descript., Holmes. xxviii, 102.
- SPURIUS**, Japan, descript., Holmes. xxviii, 103.
- Acqua DI CAPODIECI** (probably dist. fr. matico), Groves. xxiv, 64.
- Acrid SUBSTANCES** of the *Materia Medica*, Buchheim. xxii, 34.
- Acridine** (accompanies anthracene), Graebe and Caro. xix, 232.
- Actæa ALBA**, constit. of root, Dilmore. xxiii, 179.
- NIGRA**, uses, Indians. xxi, 620.
- RACEMOSA**, see **CIMICIFUGA**.
- RUBRA**, California. xxvii, 607—A. R. var. **ARGUTA**, California. xix, 298.

- Actinium**, isolation, Phipson. xxx, 312, 3.
 — OXIDE, —A. SULPHIDE, Phipson. xxx, 312.
- Actinomeris HELIANTHOIDES**, uses in Georgia. xxix, 160.
- Active PRINCIPLES**; their isolation is carried too far in therap. and in pharm., Squibb. xix, 465.
- Adad** (a thistle), Morocco. xxiii, 140; xxiv, 114.
- Adansonia DIGITATA** (Baobab), fruit in dysentery and putrescent fevers. xxiv, 167—fruit contains malate pot., Slocum. xxviii, 169—descript. and uses in India, Dymock. xxv, 182—in Jamaica. xxiv, 734, 5.
- Adavi NABHI**, — *Gloriosa superba*, India. xxix, 126.
- Add-add** = leaves of *Celastrus obscurus*, Abyssinia. xxvi, 298.
- Address of W. B. Carpenter**. xxx, 638.
 — North German Apoth. Assn. xviii, 305; xx, 33.
 — of James Richardson. xxx, 598.
 — to pharmacists of Richmond to form a pharm. assn. xxi, 107.
 — of J. Lawrence Smith. xxii, 529.
- ANNUAL**: P. W. Bedford. xxx, 583—Chas. Bullock. xxv, 474—C. Lewis Diehl. xxiii, 737—A. E. Ebert. xxi, 46—J. F. Hancock. xxii, 478—G. J. Luhn. xxvii, 750—G. F. H. Markoe. xxiv, 702—Enno Sander. xx, 38—E. H. Sargent. xviii, 27—W. Saunders. xxvi, 841—G. H. Schafer. xxix, 479—G. W. Sloan. xxviii, 497—R. H. Stabler. xix, 43.
- INAUGURAL**: P. W. Bedford. xxix, 492—Chas. Bullock. xxiv, 596—C. Lewis Diehl. xxii, 493—A. E. Ebert. xx, 48—J. F. Hancock. xxi, 59—Chas. A. Heinitsch. xxx, 602—G. J. Luhn. xxvi, 872—G. F. H. Markoe. xxiii, 768—J. F. Moore (p. 1.). xix, 25—Enno Sander. xix, 53—W. Saunders. xxv, 503—Jas. T. Shinn. xxviii, 513—G. W. Sloan. xxvii, 772—R. H. Stabler. xviii, 51.
- OF WELCOME**: Angier, mayor Atlanta. xxvi, 839—J. Cavin, mayor Indianapolis. xxvii, 746—J. B. Dill, Indianapolis. xxvii, 746—D. S. Twitchell, Kansas City. xxix, 478—H. E. Griffith, Niagara. xxx, 582—A. M. Keiley, mayor Richmond, Va. xxi, 26—Chas. F. Fish, Saratoga. xxviii, 496—W. Elliott, President Ontario Coll., Toronto. xxv, 493—Morrison, mayor Toronto. xxv, 516—Wright, Toronto. xxv, 473.
- Adenaphora** sp., China. xxiv, 755.
- Adhatoda VASICA**, descript. and uses in India, Dymock. xxv, 141.
- Adiantum CAPILLUS VENERIS**, Argent. Republic. xxiv, 764.
 — CAUDATUM, Mauritius. xxiv, 741.
 — CHILENSE, California. xix, 307.
 — PEDATUM, Calif. xix, 307; Kansas. xxix, 445.
- Adjwan** = *Ptychotis ajowan*, India. xxiv, 721.
- Adonidin**, related to Husemann's helleborin? Cervello. xxx, 444.
- Adonis vernalis**, aconitic ac. in leaves, Linderos. xxv, 171—contains adonidin, Cervello. xxx, 444.
- Adrue** = *Cyperus esculentus*, Jamaica. xxiv, 734.
- Adulsa** = *Adhatoda vasica*, India. xxv, 141.
- Adulteration**, definition, Maisch. xxix, 378—discussion. xix, 59; xxiv, 650—law necessary. xxix, 377.
 — LAWS: Michigan. xxix, 378, 396; New Jersey. xxix, 378, 394; New York. xxix, 378, 394.
 — France, wholesale dealers sell drug and adulterant separately. xxi, 503.
 — REPORT OF COMMITTEE, see REPORT and the respective drugs.
- Aegle MARMELOS** (Bael), India. xxiv, 725—account. xxvi, 257.
- Aesculin**, act. of heat, Schiff. xxix, 350—prep., Fairthorne (fr. hippocast.). xxi, 388—identical with gelseminic ac., Robbins. xxv, 135.
- Aesculus CALIFORNICA**. xix, 300.
 — GLABRA, Kansas. xxix, 451.
 — PAVIA, analysis of seed, Batchelor. xxi, 239.
- Aethalium SEPTICUM**. xxx, 144.
- Aethiops MARTIALIS**, see IRON, MAGNETIC, proto-sesqui-oxide.
 — MINERALIS (black sulph. mercury), in cholera, Croft. xxi, 316.
 — VEGETABILIS (charcoal of fucus) xxv, 116.
- Aethusa CYNAPIUM**, volat. alkaloid, Bernhardt. xxviii, 160—analysis, Hemingway. xxix, 167—
- Aethusa** (*Continued*).
 not poisonous, Harley. xxiv, 153; xxix, 167—in Kansas. xxix, 452.
- Afsharniki**, (Arab-Greek) = *Emex* sp., uses, India. xxviii, 118.
- Agar-Agar** = *Eucheuma spinosum*, uses, India. xxiv, 725; xxix, 118—is pararabin, Scheibler. xxiv, 315.
- Agaric** (*Boletus laricis*), analysis, Fleury. xix, 263; xxiv, 120—adult., Maisch. xxiii, 23, 496—resin, Fleury. xix, 263.
 — See also POLYPORUS OFFICINALIS.
- Agaricus ALBUS**. See AGARIC.
 — APPENDICULATUS, contains oxalic ac., Hamlet and Plowright. xxvi, 178.
 — ATRAMENTOSUS, a quinonoid body, Thorner. xxvii, 135.
 — BACCATUS contains oxalic ac. xxvi, 178.
 — FASCICULATUS contains mycosterin and mycoraphin, Harsten. xxiii, 123.
 — GALERICULATUS, —A. MAXIMUS, —A. PHALLORIDES, —A. PROCERUS, —A. RUBESCENS, —A. VAGINATUS, contain oxalic acid., Hamlet and Plowright. xxvi, 178.
- Agasta** = *Agati grandiflora*, India. xxv, 210.
- Agati GRANDIFLORA**, descript. and uses in India. Dymock. xxv, 210.
- Agave AMERICANA**, account, yield of fibre, etc., Murray. xxv, 127—juice in scurvy, Perin. xxv, 127—in Greece. xxv, 128—in India. xxviii, 196.
 — DESERTI, in Arizona, Palmer. xxvii, 143.
 — SHAWII, California, Palmer. xxvii, 144.
 — UTAHENSE, Palmer. xxvii, 143.
- Agents for Am. Ph. Assn.**, appointment proposed. xviii, 113.
 — AUTHORIZED, for Am. Phar. Assn. xviii, 323; xix, 564; xx, 319; xxi, 666; xxii, 580; xxiii, 856; xxiv, 843; xxv, 10; xxvi, 10; xxvii, 10; xxviii, 10; xxix, 12; xxx, 10.
 — LOCAL, where more than three members reside, proposed. xxvii, 794, 802.
- Aghara** = *Achyranthes aspera*, India. xxv, 133.
- Aginbuli** = *Ammania vesicatoria*, India. xxvii, 237.
- Agoniada LANCIFOLIA**, Brazil, constit. and prop., Peckolt. xviii, 278.
- Agonidin**, Peckolt. xviii, 278; Geuther. xviii, 279.
- Agrimonia OFFICINALIS**, germination of seed, Saunders. xxx, 566.
 — EUPATORIA, Kansas. xxix, 450.
- Agriophaselo** = pods of *Anagyris foetida*, Greece. xxiv, 189.
- Agrostemma GITHAGO**, seed found in Black Sea linseed, Holmes. xxx, 216.
- Aguacate** = *Persea gratissima*, Mexico. xxiv, 771.
- Ague Cake**, remedy (*Eucalypt. glob.*). xxvi, 280.
- "Ague Cure, CHINESE"** = *Artemisia Ludoviciana*. xxi, 500.
- Ague Mixture**: Ayer's; Christie's; Petermann's; Wilhoft's; Rhodes'; analyses, Churchill. xxiv, 417.
- Ahuehuate** = *Taxodium mucronatum*, Mexico. xxiv, 770.
- Ah-weaph** = native Indian corn, Utah. xxvii, 136.
- Ailanthus EXCELSA**, analysis of bark, Narayan Daji. xix, 270—in India. xxiv, 165; xxv, 181.
 — GLANDULOSA, uses of bark in China. xxv, 181, 234—in dysentery. xxiii, 190—in Greece. xxvii, 207; xxx, 214.
 — MALABARICA, India. xxiv, 165, 718.
- Air**, ATMOSPHERIC, liquefaction, Cailletet. xxvi, 337, 9—contains peroxide hydrogen, Struve. xix, 178—detect. of organic subst. (glass funnel filled with ice), Smee. xxi, 274.
- Aira CAESPITOSA**, and FLEXUOSA, ergot, Wilson. xxiv, 120.
- Airen** = kumiss. xxi, 200.
- Airwan**—MAIRWAN = *Kalanchoe pinnata*, India. xxv, 196.
- Aiva** (Turkish) = *Cydonia vulgaris*. xxvii, 241.
- Aivanam** = *Lawsonia alba*, India. xxvii, 238.
- Aix-la-Chapelle**, baths, artif., Hager. xxvi, 145.
- Ajenjo**, Arg. Republ. xxiv, 762.
- Ak** (AKANDA) = *Calatropis gigantea* and *procera*, India. xxviii, 139.
- Akar KELOMBA** (A. K. BRAS; A. K. KETAN; A. K. KETABA) = a species of *Rheum* in Java. xxvi, 199.

- Akaswail** = *Cassythia filiformis*, India. xxv, 145.
Akola = rootbark of *Alangium Lamarckii*, India. xxvii, 237.
Akovsaliyun (Arab-Greek) = a celery, India. xxvii, 192.
Akra = *Calatropis gigantea* and *procera*, India. xxviii, 139.
Akraniki (Arab-Greek) = a spec. of *Emex*, India. xxviii, 118.
Akukura = *Spilanthus oleracea*, India. xxviii, 147.
Alabama, pharmacy law. xxii, 330; xxx, 474, 480.
Alabu = fruit of *Lagenaria vulgaris*, India. xxvii, 230.
Alanginaceae. xxvii, 237.
Alangium *DECAPETALUM*;—*A. HEXAPETALUM*;—*A. LAMARCKII*, uses in India;—*A. TOMENTOSUM*, India. xxvii, 237.
Alaria *ESCULENTA*, yield of iodine. xxvii, 133, 4.
Alba *ALEXIPHARMACA* — arrowroot. xxiv, 739.
Albizia *STIPULATA*, examin. of gum, Masing. xxix, 213.
Albochaca = *Ocimum basilicum*, Arg. Republ. xxviii, 128.
Albumen, adult. (gum arabic, dextrin, flour), Herrburger. xxi, 396, 500—yields a trace of aldehyd with bichr. mixt., Staedeler. xxvii, 398—complete separation fr. animal liquids (hydr. ox. lead), Hoffmeister. xxvii, 534—act. of baryta at high temperature, Schützenberger. xxviii, 356—of ferric chlor., Buchner. xxx, 450; of tannin, Lorin. xxix, 362—coagulation due to carbonic acid, Mathieu and Urban. xxii, 284—non-coagulable fr. blood, Mathieu and Urban. xxii, 283; deprived of salt by dialysis is not coagulable by heat, but on adding acid, Schmidt and Aronstein. xxvi, 388; xxvii, 541; coagulat. by boiling prevented by starch, Rother. xxi, 395; coagulability restored by organic ac., Monnier. xviii, 271; xix, 238; coagulability of soluble depends on sunlight, Monnier. xix, 237—estimation: (alcohol) Heynsius. xxiv, 387; (carbolic ac.) Méhu. xviii, 271; (nitric ac.) Stobnikow. xxv, 322; (gall. and tannic ac.) Girgensohn. xxii, 284; xxiii, 464; Liborius. xxi, 396—filtrable by dilut. with water, Bamberger. xxiv, 360—deprived of its volat. salts (?) is transformed into globulin, Mathieu and Urban. xxii, 284—insoluble, restored (pepsin, mur. ac.), Wagner and Witz. xxiv, 386—prevents iodide of starch react., Puchot. xxv, 246—"natural," manuf., Campe. xxi, 397—from casein by oil mustard, Schwalbe. xxiii, 234; fr. fibrin, Gautier. xxiii, 465—pure by dialysis, Aronstein. xxii, 283—solutions dissolve freshly precip. phosph. calc., Mercadante. xxiv, 388—filtering of solut. hastened by ac. in excess, Hamburger. xxiv, 389; freed fr. salt by dialysis, Graham. xxiv, 381—sp. gr. of solutions, Witz. xxiv, 387—tests: practical hints, Almén. xix, 237; carbol. acid, Ilimow. xxviii, 357; ferrocy. pot., Bodeker. xxix, 358; acet. ac., ferrocy. pot., Hilger. xxiii, 473; picric ac., Galippo. xxiii, 473; xxiv, 389; trichloracet. ac., Raabe. xxx, 449.
Albumen, BLOOD, manuf. and yield, Campe. xxi, 397; in Germany. xix, 238—a stable liquid (by oxidized turpent.), Kingzett and Zingler. xxvi, 626—constit., causes of coagul., etc., Heynsius. xxiv, 388.
 —EGG, correct formula, Harnack. xxix, 359—cause of coagul., Heynsius. xxiv, 388—diastatic ferment, Selmi. xxx, 456—manufact. and yield, Campe. xxi, 398.
 —DRIED, prep., Martin. xxi, 397—removed fr. vessels (bichr. mixt.), Steinde. xix, 137—test for quality, Cordillot. xxviii, 357—yield. xxx, 449, note.
 —IODATED, Boldeau. xxii, 284.
 —TANNATE, better borne than tannin, Levin. xxx, 451.
 —WATER, substit. for beef tea and milk. xxx, 100.
Albuminates, spectroscop. react., Adamkiewicz. xxiii, 464.
Albuminoids, act. of chlor. zinc, Jorisson. xxix, 267—of tannin, Levin. xxix, 362—constit., Commaile. xxiii, 463—precip. by xanthogenic ac., Zöller. xxix, 358—crystall. compounds, (alc., dialys.) Drechsel. xxviii, 356; found in hemp
Albuminoids (*Continued*).
 and ricinus seeds, Ritthausen. xxx, 449. See also PROTEIN COMPOUNDS.
Alcamines (by chlorhydrides on second. amines), Ladenburg. xxx, 399.
Alcanna, see ALKANET.
Alcohol, ABSOLUTE, what is it? Squibb. xxi, 559—act. of chlor. in sunlight, Berlandt. xix, 242—prep.: caustic lime, Mendeleeff. xxi, 221; Bullock. xxii, 225; Smith. xxiii, 338.
Alcohol, convert. into acet. eth. by cryptogams, Rimmington. xxiii, 467—act. of bromine, Hardy. xxiii, 345; of chlorine. lime, theory, Schmitt and Goldberg. xxviii, 275; of hypsulph. sod. (mercaptan), Otto. xix, 243; of metall. ferricy., Bong. xxvi, 369; of rhodium, ruthenium, iridium, Deville and Debray. xxiii, 317; upon resins, gum resins, balsams, Hirschsohn. xxvi, 453—fr. leaves of sugar beet, Pierre. xxvi, 513—buying and selling, Squibb. xxi, 70, 548; discussion. xxi, 70—in California. xxvii, 621—compound with chlor. calc., Heindl. xxx, 336—commercial chlorine derivatives, Biel. xxvi, 472—detect. in chloroform (sulphmolybd. ac.), Boettger. xxviii, 274—found in coal tar, Witt. xxvi, 472—contraction at low temp., Shuttleworth. xxi, 128—fr. cranberries, Moody. xxvii, 175—deodorizing, Squibb. xxv, 546; (fused sod. acet. at last) xxviii, 273; (by electrolys.), Daudin. xxx, 337;—(nitr. silv.), Berlién. xxviii, 273—dilution to any strength, Wenzell. xxvii, 705; Pile. xxiii, 112—distillat., exam. of products, Pierre and Puchot. xxviii, 273; of "98.5," water goes over first, Bel. xxvii, 400—drug market. xxi, 424; xxii, 620; xxiv, 394; xxx, 464—estimation: cobalt, sulphocy. am., Monell; sol. nitr. merc., am., Jacquemart; in beer and wine (hallymetry), Wittstein. xxvii, 400—freezing point of diff. degr., Raoult. xxix, 292—frothing on rectif. averted by sulph. ac., Lloyd. xxiii, 341—detect. of fusel oil (chloroform), Betelli. xxiii, 351; (iodide pot.), Bouvier. xxi, 337—history, Babcock. xxix, 291—hypoderm. inject., Schwabbe. xxvii, 94—prevents iod. starch react., Vogel. xxii, 224—fr. lichens, Stahlschmidt. xix, 241; in Finland. xxi, 327—fr. licorice root, Griessmayer. xxiii, 339—detect. of methyl alc. (col. of meth. anilin), Riche and Bardy. xxiii, 349; (permangan. pot.), Cazeneuve and Cotton. xxix, 298—fr. milk, Reichardt. xxiii, 339—fr. milk sugar, Reichardt. xxiii, 339—in mixt. cont. mucil. acac. (dilute first), Bidwell. xxiii, 612—percentage, its meaning, Squibb. xxi, 555—in plants, Gutzeit. xxiv, 287—does not ignite potassium, Vogel. xxii, 225—fr. potatoes, sulph. ac., malt. xxix, 291—purificat., see deodorisat.—fr. sawdust, Zetterland. xxii, 225—sp. gr. and p. c., Lyons. xxx, 121; relat. of errors in p. c. to price per gallon, Squibb. xxi, 554—strength approxim. estimat. (burning filt. paper), Barfoed. xxiii, 338; apparatus (capillary attract.). xxx, 336—greatest concentr. (99.3 p. c.), Bel. xxvii, 399, 400—what "95" p. c. really means, Squibb. xxi, 558—strength of officinal suggested (50, 70, 92), Davis. xxvi, 147—table, Robbins. xxvii, 400; Squibb. xxi, 563–72; Lyons. xxx, 121—temp., infl. on quantity and appar. strength, Squibb. xxi, 556—tests: chlor-benzoyl, Berthelot. xxi, 326; sulphomolybdic ac., Davy. xxv, 275; sol. nitr. merc., am., Jacquemart. xxviii, 274; iodoform, Lieben. xviii, 245; minute quantit. (bichrom. mixt., caust. soda), Thresh. xxvii, 397—and water is a combinat., not a mixt., Squibb. xxi, 549; detect. of traces of water (permangan. pot. in cryst.), Debrunner. xxviii, 274; (citro-molybdic ac.), Mann. xxix, 292—weight and measure, Squibb. xviii, 171; xxi, 552—yield fr. glucose, cane sugar, starch, Friedländer. xxiii, 337; fr. mash increased by sulphurous ac., Beanes. xix, 193.
Alcohol, ALLYLIC, fr. oxal. ac., glyc. xix, 250—in destruct. dist. of wood, Aronheim. xxiii, 352—is the cause of the penetrat. odor of methyl alc., Aronheim. xxiv, 294.
 —AMYLIC (fusel oil), act. of bromine, Hardy. xxiii, 346—constit. of crude, Krämer and Pinner. xviii, 248—compound with chlor. calc.,

Alcohol (Continued).

- Heindl. xxx, 336—and chlor., Kemper. xviii, 249—dextro-gyrate, Bel. xxvii, 411—yields no iodoform, Hager. xxx, 346—distill. betw. 128–132° C., suff. pure, Greene. xxvii, 414; objected to, Dott. xxviii, 283—tests: chloroform, Betelli. xxiii, 351; iod. pot., Bouvier. xxi, 337; bichrom. mixt., zinc., Dupré xxiv, 286; filt. pap., let dry; fract. distill., Hager. xxx, 349; anilin, mur. ac., Jorisson. xxx, 350; react. is due to furturol, Förster. xxx, 350.
- **AMYLIC, ACTIVE and INACTIVE**, Bel; Pasteur. xxii, 236.
- compound with **BARYTA**, Vincent and Delachanal. xxix, 299.
- **BUTYLIC**, act. of bromine, Hardy. xxiii, 346.
- **CAPRYLIC**, fr. oil of *Curcas purgans*, Silva. xviii, 249—yields iodoform. xxx, 346.
- **CAUSTIC**, see **SODIUM, ETHYLATE**.
- **ETHYLMETHYLETHYLIC** (= active amyl. alc.), xxvii, 414.
- **FLUORENIC**, fr. diphenylencarbonyl, Barbier. xxiv, 301.
- **ISOBUTYLIC**, fr. amyl. alc. xxvii, 413—pure not obtainable, Barbaglia. xxii, 235—compound with chlor. calc., Heindl. xxx, 336.
- **ISOPROPYLETHYLIC** (= inact. amyl. alc.), xxvii, 414.
- **METHYLIC**, acet. ac. by ferment. with mutton liver, Béchamps. xviii, 243—detect. of ethyl. alc. (conc. sulph. ac.), Berthelot. xxiii, 349; (permang. pot.), Cazeneuve and Cotton. xxix, 298—chloroform fr. pure meth. alc. and chlorin. lime, Belohoubek. xxi, 332—estimat. of p. c. (form. of iod. methyl), Krell. xxiii, 348—yield of iodoform proves impurity, Lieben. xix, 242; xxx, 346—odor due to allyl. alc., Aronheim. xxiv, 294—pure, prep.: fr. form. calc., Friedel and Silva. xxii, 224; fr. form. sod., Bardy and Boret. xxviii, 282; fr. methyl-oxalic ether, Erlenmeyer. xxiii, 350—constant use leads to fatty degen. of liver, Poincaré. xxvii, 410. See also **CARBINOL**.
- **OCYL**, see **ALC. CAPRYLIC**.
- **PINACOLIC**, fr. pinacolin, Friedel and Silva. xxii, 251.
- **PROPYLIC**, act. of bromine, Hardy. xxiii, 346—synthesis (fr. chlor. ethyl), Rossi. xviii, 248.
- Alcool CAMPHOLIQUE**, Berthelot. xxviii, 474.
- Alcoolat DE CANNELLE COMP.** xxix, 95.
- Aldehyd**, act. of bromine, Pinner. xxiii, 346—estimat. in spir. æth. nitr., Remington. xxviii, 68—yields iodoform, Hager. xxx, 346.
- **CINNAMIC**, Leist. xxii, 235.
- **ISOBUTYLIC**, Barbaglia. xxii, 235.
- **SALICYLIC** (= salicylous ac.). xxiii, 246—as antisept. and antizymot., Apery. xxx, 387—fr. salicyl. ac., nitr. ac., Phipson. xxvi, 544.
- Aldehydina**, identical with collidina, Vohl. xix, 231.
- Alder CALIFORNIA** = *Alnus Oregona*. xxvii, 600.
- **EUROPEAN**, see *ALNUS GLUTINOSA*.
- Aletris**, adult. of powd., Allaire. xxx, 577.
- Aleurites CORDATA**. xxiv, 173.
- **TRILOBA**, act. of the oil. xxiii, 223—yield of oil, Nallino. xxi, 260.
- Aleurone**, account, Leigh. xxviii, 365.
- Alexander, M. W.** xix, 70, 72.
- Alexisbad**, spring, analysis, Pusch. xviii, 217.
- Aflerilla** = *Erodium circutarium*, Calif. xxvii, 604—Arg. Republ. xxiv, 762.
- Algae**. xxi, 203; xxiii, 123; xxv, 116; xxvi, 173; xxvii, 132; xxviii, 101; xxix, 117; xxx, 138.
- yielding iodine. xxvii, 132, 4; xxx, 138.
- Algarobia GLANDULOSA** (Mezquite gum plant), account. xxvii, 253, 4. See also **MEZQUITR**.
- Algarroba BLANCA**, Arg. Republ. xxiv, 764.
- Alhagi MAURORUM**, descript. and uses, India, Dy-mock. xxvii, 257.
- Alisma CALIFORNICA**. xix, 307.
- **PLANTAGO**, Japan, descript., Holmes. xxviii, 105—Kansas. xxix, 439.
- Alismaceæ**. xxvii, 140; xxviii, 105; California. xix, 307; Kansas. xxix, 439.
- Alizarin**, (artificial), history, etc., Russell. xxii, 210—identical with natural, Perkin. xxi, 392—distinct fr. natural (permang. or bichrom. pot., and ac.), Reber. xxiii, 458—coloring power, Küpfer.

Alizarin (Continued).

- xxiv, 382—colors not to be compar. to those of natural, Young. xix, 284—fr. anthracene, Græbe and Liebermann. xxiii, 457, 8; fr. rufigallic ac., Widmann. xxiv, 384—spectrum of artif. and nat. identical, Vaughan. xviii, 272—as test for acids and alkalies, Schaal. xxii, 282.
- **BROWN**, Piudhomme. xxvii, 533.
- **ORANGE**, Caro. xxvii, 532.
- Alizapurpurin**, Reimann. xix, 223.
- Alkali-albuminate**, Heynsius. xxiv, 388.
- Alkalimetry, INDICATORS**: review, Dunn. xxvii, 376—Boettger (alkannin). xix, 141; D'Heuy (use of yellow soda flame). xxii, 187; Fittig (mesitylenchinon). xxii, 276; Langbeck (nitrophenic ac.). xxix, 241; Lunge (methyl orange). xxx, 442; Lux (flavescin). xxix, 356; Maschke (haematoxylin) xxiii, 458; Miller (tropæoline). xxvi, 375; xxvii, 325; Pellegri (phyllocyanin). xxiv, 384; Schaal (alizarin). xxii, 282; Siebold (hydrocy. ac.). xxvii, 320, 326; Stevenin (violet or mallow fl. in glyc.). xxiv, 235; (fluorescein) xxv, 242.
- Alkaline EARTHS**, separat. in analysis (carbon. ammon.), Reinsch. xix, 201.
- Alkaloids** are a useless and dangerous refinement, Squibb. xx, 231—act. of organic ac. at high temp., Beckett and Wright. xxiv, 342; of sulph. hydrog., Schmidt. xxiii, 389—electrolysis (deductions), Bourgoin. xix, 223—estimat: Cazeneuve (lime, ether). xxv, 297; Hager (as picrates). xxx, 399; Lepage (iod. cadm., pot.). xxv, 298; Lösch (review). xxviii, 317; Prescott (iodohydrarg. pot.). xxx, 399; Thresh (iod. bism., pot.). xxviii, 319—isolated by coal tar benzol, Boiraux and Leger. xxiii, 318, 390; chloroform, Nowak. xxi, 367; oleic ac., Wolff. xxvii, 478; oxal. ac., Alessandri. xxx, 399; dry with white bole and extr., Heintz. xxvii, 478; Stas' method, subst. earthy carbon. for caust. pot., Skey. xxvi, 477; dry with quartz sand, and extr., Rice. xxvii, 479—fungus growth prevented in sol., Squibb. xxi, 96; xxv, 550; Stuart. xxix, 521—hypoderm. sol. preserved by salicyl. ac., Squibb. xxv, 550—incompatible with medicat. waters, U. S. Ph., Owen; Maisch. xix, 143—micro-sublim. point, Blyth. xxvii, 482; Köhler (unreliable). xviii, 291; Sedgwick (unsatisfactory). xviii, 292—soluble in oil by intervent. of glac. acet. ac., Barnes. xxiv, 343—poisonous antidote: iod. starch, Bellini. xxv, 286; methyl-iodides of poisonous alk. act differently fr. the alk., Crum Brown and Frazer. xviii, 292—act. of plant-alkaloids upon ferricy. pot., Beckerts. xxx, 440—soluble in alc., Lafean. xxx, 324—tests: precipitates with reagents only indicative, but not conclusive, Power. xxvii, 206; color tests not perfectly reliable, Squibb. xxv, 524; col. tests with mur. ac., rendered more stable by starch, Pappe. xxiv, 344—tests: butter antimony, Godeffroy. xxvi, 559; bichrom. mixt., chlorin. lime, Hamlin, Jr. xxix, 324; iodide bismuth and pot., Yvon. xxiii, 389; Thresh. xxviii, 58; ferric chlor., Godeffroy. xxvi, 559; ferric chlor., sulph. ac., How. xxvi, 560; iodosulphates the most characteristic, Sedgwick. xviii, 292; perchloric ac., Fraude. xxvii, 322; phosphor. ac., Nowak and Kratschmer. xxii, 262; phospho-tungstic ac., Schering. xxi, 369; silico-tungstic ac., Godeffroy. xxv, 262; stannous chlorides, Godeffroy. xxvi, 559; sugar, sulph. ac., Schneider. xxi, 368; sulpho-molybd. am., Buckingham. xxi, 369; chlor. zinc, Jorisson. xxviii, 321; xxix, 267.
- Alkaloids**, compounds with **BILIARY ACIDS**, Arbre. xxi, 371.
- **BROMIDES**, Bullock. xxiii, 703; McDonald. xxi, 370.
- **HYDROCYANATES**, do not exist, Flückiger. xxi, 370.
- **MYDRIATIC**, sources and relation, Merck. xxx, 421.
- containing **OXYGEN** but no nitrogen, Weidl. xxi, 366.
- **NITROPRUSSIDES**, Davy. xxix, 325.
- **SULPHO-COMPS.**, Schmidt. xxiv, 343.
- Alkanet**, detect. in urine, Chancel. xxvi, 267.

- Alkanet PAPER** (eth. tinct. alk.). xix, 141.
- Alkannin**, constit. acc. to several chemists. xxix, 354—prep., Carnelleti and Nosini. xxix, 354—as test for magnes. salts, Lepel. xxix, 354.
- Alkargen** (cacodylic ac.), very poisonous, Lebahn and Schultz. xxviii, 283.
- Allaire, Chas. B.** Glucose as subst. for cane sugar in pharm. xxix, 405—purity of powd. drugs. xxx, 574.
- Allamanda AUBLETII**, India, descript., uses, Dymock. xxviii, 140—**A. CATHARTICA**. xxviii, 140.
- Allen, Hair Restorer**, analys., Chandler. xviii, 215.
- Allium ACUMINATUM**, Calif. xix, 307.
- **CANADENSE**, Kansas. xxix, 447.
- **DESCENDENS**; — **A. MOLY**; — **A. PORRUM**; — **A. SCHÆNOPHRASUM**, in Greece. xxiv, 123.
- **SENESCENS**, Japan, descript., Holmes. xxviii, 109.
- **SUBHIRSUTUM**, in Greece. xxiv, 123.
- Alloys**, act. on nitr. ac., Acworth and Armstrong. xxvi, 343.
- Allspice**, Jamaica, account. xxiv, 735—act. of sulph. ac., alc., Doliber. xix, 444—leaves as tanning mat., Jamaica. xxiv, 736.
- **WILD**, see **BENZOIN ODORIFERUM**.
- Allum** (1610), Carthagenæ. xix, 494—Roach. xix, 494.
- Allyl-ALCOHOL**, see **ALC.**, **ALLYL**.
- **CHLOROFORM**, fr. croton-chloral, Mason. xxii, 234.
- **CYANIDE** (in nat. oil of mustard). xxiv, 296.
- **SULPHOCYANIDE**, by act. of myrosin on myron. pot., Schmidt. xxv, 31, 74—is first by heating convert. into oil of mustard, Gehrlich. xxiv, 295, 6—fr. iod. allyl; sulphide pot., chlor. cyan., Dilleter. xxiv, 295.
- Almanac**, **POPULAR HEALTH**, Maisch. xxiii, 818.
- Almiræ** = *Microrhynchus sarmentosus*, India. xxv, 158.
- Almonds**, **BITTER**, hydrocy. ac. does not pre-exist, Boettger. xxvi, 367—yield of amygdalin, Lehmann. xxiii, 437—physiology of amygdalin and emulsin, Portes. xxvi, 282—bassorin exudes from seeds, Vulpius. xxvii, 239—cult. in Calif., Murphy. xxx, 235.
- **BRAN**. xxx, 104.
- **SWEET**, constituents, Schutz. xxi, 254—cont. amygdalin, Heuschen. xxi, 387—glycerin extracts a ferment act. on amygdalin, Porter. xix, 234.
- Alnus GLUTINOSA**, analysis of wood, Dreykorn and Reichardt. xix, 293.
- **OREGONA**, Calif. xix, 306; xxvii, 600—**A. VIRIDIS**, Calif. xix, 306.
- Aloe ABYSSINICA**, source of Jafferabad aloes. xxix, 125.
- **JAFERABAD**, India, descript., Dymock. xxv, 126; Holmes. xxix, 124.
- **LEPTACAULON**, Madagascar. xxx, 150.
- **MADAGASCAR**, fr. A. Sahundra, Baker. xxx, 149.
- **SAHUNDRA**, Madagascar. xxx, 150.
- Aloes**, differences due as much to diff. in extraction as to spec. or climate, Squibb. xx, 236—adult. of powd. xxx, 576; mineral adult. det. by chloroform. xxviii, 278; suspicious price. xxiv, 394—detect. in beer, Dragendorff. xxx, 340; Wittstein. xxiii, 341—chemistry, Branson. xxvii, 143—constituents, Craig. xxiii, 133—drug market. xix, 402; xx, 122; xxii, 626; xxiv, 396; xxvii, 560—solub. in glyc. xxvi, 190—volat. oil, Craig. xxiii, 133—pill, excipient (manna), Fairthorne. xxx, 101—yield of purif., Maisch. xxvi, 130—resin, Craig. xxiii, 133—tests: benzin, ammon., Bornträger. xxix, 125; (precaut. necessary, Groves. xxix, 125; reaction is due to chrysophan. ac., Lenz. xxx, 150;) fusel oil, Dragendorff. xxx, 150.
- Aloies**—*Pinus Cembra*, France. xxvi, 322.
- Aloin**, no advantage as a subst. for aloes, Brown. xxv, 401—"changed" is not inactive, Craig. xxiii, 134—constitution, Craig. xxiii, 133; Schmidt. xxiv, 379; Sommaruga and Egger. xxiii, 451—decomp. by alkalies, Tilden. xix, 144—examinat. of various aloins, Tilden. xxiv, 378—oxidat. products, Tilden. xxvi, 614—prep., Mitchell. xxiv, 379; Schmidt. xxiv, 379—therapeut. value, Dobson. xxvi, 616.
- Alopecurus PRATENSIS**, ergot, Wilson. xxiv, 120.
- Aloxanthin** (=oxidiz. barbaloin) Tilden. xxvi, 614, 6—is methyltetroxy-anthraquinone, Tilden. xxvi, 615.
- Aloysia CITRIODORA**, Algiers. xxvi, 278.
- Alpinia JAPONICA**, Japan, descript., Holmes. xxviii, 115.
- Alpinin**, fr. galangal, Jahns. xxx, 448.
- Alpogada PAZHAM**—*Prunus Bokhariensis*, India. xxvii, 329.
- Alstonia, AUSTRALIAN**—**A. constricta**.
- **CONSTRICTA**, alkaloids, Thelin and Schlagdenhauffen. xxvii, 174—analysis, Hesse. xxix, 154—Mohr. xxviii, 141—descript. xxv, 364; Mohr. xxviii, 141.
- **PLUMOSA** yields caoutchouc, Fiji. xxvii, 269.
- **SCHOLARIS**, account and analysis, Gruppe. xxv, 370; Hildwein. xxii, 111—contains ditain, Gruppe. xxii, 111—yields Satween bark, India. xxiv, 724—descript. and uses in India, Dymock. xxv, 153, see also **DITA**.
- Alstonicine**, Oberlin and Schlagdenhauffen. xxvii, 175.
- Alstonidia** and (7) salts, Hesse. xxix, 155.
- Alstonina** (of Müller and Rummel) is chlorogenin and porphyrin, Hesse. xxvii, 174—prop., Hesse. xxix, 154—prep. and prop., Müller and Rummel. xxvii, 518—Oberlin and Schlagdenhauffen. xxvii, 175—of Scharlée is now: ditamina, Husemann. xxvi, 605.
- Altamisa**, Arg. Republ. xxiv, 762—=**Pyrethr.** parthen. Chili. xxiv, 765.
- Althaea FICIFOLIA**, uses in Turkestan. xxi, 234.
- **OFFICINALIS**, (marshmallow) adult. of powd. xxx, 576—descript. U. S. Ph. revis. xxvi, 671—Arg. Republ. xxiv, 764—uses in India, Dymock. xxvi, 162—in Turkestan. xxi, 234.
- **ROSKA**, asparagin in root, Clausen. xxx, 217—in Japan. xxviii, 169.
- Alti**=spec. of *Hibiscus*, India. xxvi, 159.
- Altingia EXCELSA**, Java, descript. of resin, Möller. xxiii, 159.
- Alum** (**POTASSIC**), often cont. ammon., Godeffroy. xxii, 314—act. of heat on solut., Naumann. xxiv, 243—perfect crystals, Polis. xxix, 260; crystals dissociate in sealed tubes at 212° F., Naumann. xxvi, 390—fluidvolume, Candidus. xxvii, 709—manuf. (free from iron), Spruce. xxvii, 338—in India. xxiv, 786—solub. in alcohol, Candidus. xxx, 565.
- **AMMON. FERRIC**. See **IRON AND AM. SULPH.**
- **BURNT** (ustum) commercial is defective, Bernbeck. xxviii, 240—solub. in alcohol, Candidus. xxx, 565.
- **CHROME** (fr. bichr. pot., sulph. and oxal. ac.), Lielegg. xxii, 198.
- **NICOTINA**, Kirchmann. xxv, 314.
- **"SEEDS"** (India). xxiv, 786.
- **SODA** in Japan, Divers. xxx, 295.
- Alumina** dissolves in baryta water, Beckmann. xxx, 294—act. of borax, Jehn and Reichardt. xxiii, 282—in cryptogams, Church. xxiii, 126—estimat. in pres. of iron, MacIvor. xxiii, 281—freed fr. iron oxide (baryta water) Beckmann. xxx, 294; (sod., bar., calc. sulphide), Condry and Rosenthal. xxviii, 239.
- Alumina SACCHARATA**, Athenstaedt. xxiii, 364.
- Aluminium**. xviii, 233; xxii, 195; xxiii, 281; xxiv, 243; xxvi, 389; xxvii, 337; xxviii, 239; xxix, 260; xxx, 294.
- Aluminium** is less readily affected by ord. infl. than silver and white metal, Winkler. xxvi, 389—amalgam, peculiarities, Casamajor and Jehn. xxvi, 389—product. in France. xxvii, 337—act. on nitr. ac., Acworth and Armstrong. xxvi, 343—fluorescence of salts, Soret. xxvii, 346—act. of trimethylamin, Vincent. xxv, 315.
- Aluminium ACETATE**, antisept. value, Bruns. xxvii, 452—double compound, Athenstaedt. xxx, 380—solut., prep. xviii, 255.
- **ACETO-CITRATE**, Athenstaedt. xxx, 380.
- **ACETO-LACTATE**, Athenstaedt. xxx, 380.
- **AMIDOSULPHONATE**, Berglund. xxvii, 332.
- **CARBONATES**, Urbain and Renoul. xxvii, 337.
- **CHLORIDE**, as antiseptic, Gamgee. xix, 205—prep. (clay, bisulph. carb., mur. ac.) Curie. xxii, 195.

Aluminium HYDRATE, contamin. with basic sulphate, Godeffroy. xxii, 314—isomeric modif., Tommasi. xxix, 260—as clarifier of sugars for polarizat. xix, 204.
 — IODIDE, prep., Gustavson. xxx, 295.
 — PALMITATE, prep. and uses. xxx, 361.
 — PHOSPHATE, solubl. in ammonia, Koninck and Thiriart. xxix, 261.
 — SULPHATE, detect. of free acid, xxii, 196—as disinfectant, Tedesco. xxviii, 240—fluid volume, Candidus. xxvii, 709—industr. uses. xxvii, 339—freed fr. iron (carb. lime, caust. soda), Dulca. xxvi, 389—U. S. Ph., (more water and better washing), Lloyd. xxviii, 239—sesquibasic, Marguerita. xxix, 260.
Alvo BOKHARA—*Prunus Bokhariensis*, India. xxvii, 239.
Amala—*Emblica officinarum*, Turkestan. xxi, 260.
Amalgams, constit., Merz and Weith. xxx, 305.
Amanita MUSCARIA, poisonous alkaloid, Kopp and Schmiedeberg. xviii, 273.
 — PHALLORIDES;—A. RUBESCENS;—A. VAGINATUS, contain oxalic ac., Hamlet and Plowright. xxvi, 178.
Amanatin ident. with neurin, Diakonow. xxvi, 611.
Amaranth, BARK—*Swietenia mahogany*. xxvi, 269.
 — WILD—*Amaranthus blitum*. Kansas. xxix, 439.
Amaranthaceae. xxiii, 147; xxv, 133; xxvii, 153; in Kansas. xxix, 439.
Amaranthus ALBUS;—A. BLITUM, Kansas. xxix, 439.
 — LEUCOCARPUS;—A. POWELLII, Utah. xxvii, 153.
 — SPINOSUS, Mauritius. xxiv, 741.
Amaryllidaceae, xxv, 127; xxvi, 191; xxix, 128; in Kansas. xxix, 439.
Amba—mango gum, India. xxv, 218.
Amber (succinum), analysis, Helm and Schrötter. xxvi, 470—cleaned. xxvii, 395—deposit in New Jersey. xxviii, 271, 2—microscop. charact., Helm. xxvii, 395—prop. and solub., Helm. xxvi, 468; Sacc. xix, 310; in eucalypt. oil, Osborne. xxvii, 234—sp. gr., Hager. xxvii, 424—contains sulphur, Helm. xxvii, 395—distinct. of true fr. artificial and fr. copal, Rehoux. xxvi, 471; xxviii, 271.
 — ARTIFICIAL. xxviii, 271.
 — “UNRIPE”—gedanite, Helm. xxvii, 396.
Ambergreece (1610). xix, 494.
Ambergrieis, account. xxiv, 831—in large lots. xxiii, 529.
Ambrina AMBROSIOIDES, Chili. xxiv, 765.
Ambrosia ARTEMISIARFOLIA, for rhus-poisoning, Zabriskie. xxviii, 102—in Kansas. xxix, 441.
 — TRIFIDA, Kansas. xxix, 441.
Ambrosine, a fossil resin, Sheppard. xviii, 272.
Amelanchier CANADENSIS, var. ALNIFOLIA, Calif. xix, 301.
Amendments, see BY-LAWS and CONSTITUTION.
American Ac. of Science and Arts, delegates to its Centennial meeting. xxviii, 498.
Amidon, etymology. xxiii, 359.
Amisa JURI—*Fritillaria Thunbergii*, Japan. xxviii, 110.
Amlaki—*Phyllanthus emblica*, India. xxvii, 194.
Ammannia VESICATORIA, descript. and uses in India, Dymock. xxvii, 237.
Ammi COPTICUM—*Ptychotis ajowan*, India. xxvi, 441.
Ammonia, apparatus, Diehl. xxii, 564—act. upon resins, gum resins, balsams, Hirschsohn. xxvi, 455—anhydrous, solvent power, Seely. xix, 200—detect. of anilin, toluidin, etc. (nitr. ac.) Wittstein. xxiii, 275, 513; xxviii, 236—in California. xxvii, 620—condensator, Kern. xxiii, 31—limit for react. with copper, Wagner. xxx, 286—estimat., pract. hints, Rudorff. xxii, 191; in gas liquor; apparatus, Foster. xxix, 258; apparatus. Knoblauch. xxx, 288—format. during sol. of metals in nitr. ac., Piper. xxv, 263—natural form. fr. nitrates by animals; the ocean as ammonia reservoir, Schlösing. xxiv, 239; fr. nitr. ac. (ac. protochlor. tin), Dumreicher. xxix, 242—salts fr. gas liquor, Payne. xxii, 191; purified. xix, 200—constant generator, Kämmerer. xxv, 54—act. upon guaiac. paper in pres. of sulph. copp., Greiner. xix, 200—hypodermic

Ammonia (Continued.)

sol., Helford. xxvii, 92—industry, history, etc., Seidel. xxii, 273—act. of ozone, Houzeau. xxi, 271—act. upon phosphorus, Blondlot. xix, 196—preparation: fr. the atmosphere (air and steam over red hot coal) xxviii, 236; Knab. xxvii, 328; fr. charcoal of wool-waste, Booth. xxii, 192—source detect. by nitr. ac. xxiii, 275, 513; xxviii, 236—sp. gr. of solut., Wachsmuth. xxvi, 378—synthetically (by electricity), Donkin. xxii, 189—tests: Kötter, corros. subl. xxi, 293; Eisbrodt. xxii, 190; Hager, Bohlrig's test (corr. subl., pot. carb.) xxviii, 236; Holdermann, sulph. copp. xxii, 190; Wanklyn, pre-caut. with Nessler test. xxii, 190—test paper. xxii, 51; fuchsin in acidul. water, Krouper. xxx, 289—volcanic, Attfield. xxii, 192.
 — WATER fr. sulph. ammon. apparatus, Diehl. xix, 518—3 F. and 4 F. are rather delusive. xix, 341.
Ammonium. xix, 200; xxi, 293; xxii, 189; xxiii, 273; xxiv, 239; xxv, 255; xxvi, 378; xxvii, 328; xxviii, 236; xxix, 258; xxx, 288.
Ammonium, ACETATE, cryst., Berthelot. xxiii, 369—acid. xxiv, 321—commercial, constit. xxiv, 321.
 — AMIDO-SULPHONATE, Berglund. xxvii, 331.
 — BENZOATE, solubl. in alc., Candidus. xxx, 564—home-made, cost. xx, 206.
 — BICARBONATE, solubl. in water, Dibbits. xxiv, 239.
 — BITARTRATE, Fairthorne. xxix, 317.
 — BORATE as preservative, Jacques. xxi, 282.
 — BORO-CITRATE (mono—, di—, tri—), Scheibe. xxix, 320.
 — BORO-DISALICYLATE, Jahns. xxvi, 539.
 — BROMIDE, fluid volume, Candidus. xxvii, 709—preparation: Markoe, am. carb. for ammonia. xxi, 514; Phar. Soc. Paris, bromine and ammon. xxv, 255; Pile, brom. and ammon. xxii, 434; Rice, brom. pot., sulph. am., alc. xxi, 293, —prop., solubl., Eder. xxx, 275—solubl. in alc., Candidus. xxx, 564; in ether, Wells. xxv, 255.
 — CAMPHORATE, Fairthorne. xxix, 287.
 — CANTHARIDATE, Wolff. xxv, 238.
 — CARBONATE, act. upon sulphates of alkal. earths, Reinsch. xix, 201—adult. (glue, bicarb. sod., ammon.). xix, 340—comp. of commercial, Vogler. xxvii, 329—drug-market. xxiv, 395. xxv, 348; xxvi, 653; xxvii, 556, 560; xxviii, 368; xxx, 464—fluid volume, Candidus. xxvii, 709—contains iodine, Sticht. xviii, 219—preparation, subst. carb. barium for carb. calc., Seidel. xxiii, 275—solubl. in alc., Candidus. xxx, 565.
 — CARBONATE, NEUTRAL. Divers. xix, 200.
 — CHLORIDE, see AMMONIUM MURIATE.
 — DICHLOROPROPIONATE, Backuns and Otto. xxvi, 533.
 — FLUOSILICATE, (fr. fluosil. iron), Stolba. xxiv, 221.
 — GAMBOGIATE, Costelo. xxvii, 210.
 — GLYCRRHIZATE, see GLYCRRHIZIN, AMMON.
 — GUNPOWDER (nitr. am., nitr. pot.) xix, 169.
 — HYDROSULPHATE, Troost. xxviii, 237.
 — HYPOCHLORITE, explosive, Salzer. xxvii, 305.
 — IODIDE, U. S. Ph. proportions incorrect, Rice xxi, 293—solubl. in ether, Wells. xxv, 255—stable (by albumen and mannite), Pavesi. xxvii, 312.
 — MOLYBDATE, nature and cause of yellow precip. in solut., Jungk, Fresenius, Uelsmann, Kern. xxvi, 406.
 — MURIATE, explos. with chlorin. lime, Salzer. xxvii, 305—solut., when pure, does not decomp. by keeping, Hager. xxvii, 329—fluid volume, Candidus. xxvii, 709—manif. in India. xxiv, 787—preparat. fr. the atmosphere, Rickman and Thompson. xxx, 288—solubl. in alc., Candidus. xxx, 565.
 — MURIATE, compd. with chlor. pot. and chlor. sod., Chevreul. xxvi, 381.
 — NITRATE, fluid volume, Candidus. xxviii, 420—melting point, Pickering. xxvii, 239—serves both to reduce and elevate the temperature (in water, add zinc powder), Boettger. xxvii, 329.
 — NITRITE, Berthelot. xxiii, 275; xxvi, 381.
 — OXALATE, solut. decomp. to carbon. am., Fleury. xxvi, 549—home-made, cost. xx, 206—prep., Haberdank. xxi, 361.

- Ammonium and PLATIN. SULPHOCYANIDE**, Skey. xxiii, 267.
- **PICRATE**, as test for gallic ac., Dudley. xxviii, 317—for whooping-cough. xxvii, 96.
- **SALICYLATE**, for internal use, Martenson. xxiv, 326—physiol. effect, James. xxix, 314—long exposure to the air to be avoided, Pennypacker. xxvi, 542.
- **SALICYLATE, ACID**, Hoffmann. xxvi, 541.
- **SELENIATE**, prep., act. of heat, Cameron and Davy. xxvii, 304.
- **SULPHATE**, adult. (ammon. sulphocyan.) xxi, 488—purif. fr. gas liquor, Esilman. xxiv, 239; Marche. xxx, 288—fr. excrements in Gratz, Austria, xxvii, 300; fr. refuse of wool, horn, skin, etc., Hote. xxii, 192.
- **SULPHOCYANIDE**, as test for silver, chlor., brom., iod., Volhard. xxvii, 322.
- **SULPHOMOLYBDATE**, as test for alkaloids, Buckingham. xxi, 369.
- **TRIBROMIDE**, Roozeboom. xxx, 276.
- **TRICHLORACETATE**, Clermont. xxi, 359.
- **VALERIANATE**, neutral, Hager. xxvii, 306.
- **VANADIATE**, for ink. xxii, 201—technical uses, Wagner. xxvi, 406—fr. alkaline vanadates, Gerland. xxvi, 405.
- Ammoniacum**, act. of zinc-dust, Ciamician. xxviii, 273—adult. xxi, 232; (quartz.) xxi, 477—behav. to reagents, Hirschsohn. xxvi, 453—9—descript. U. S. Ph. revis. xxvii, 671—powdering: (sugar of milk), Bibby. xxiv, 96—purified; (to paste with alc., strain, evap.), Dieterich. xxvii, 397—soluble in aqueous menstr. incr. by certain salts, Blackwell. xxvii, 70—does not contain sulphur, Moss. xxi, 231.
- Ammoniacum, AFRICAN**, fr. *Ferula orient.* xxiv, 114—descript. Hanbury. xxi, 230—analysis, Moss. xxi, 231.
- Amole**=*Chlorogale pomeridianum*, in Calif. xxvii, 611.
- Amomeaceae**. xxi, 209; xxii, 101; xxiv, 125; xxv, 128; xxvi, 193; xxviii, 112; xxx, 153.
- Amomum AMARUM**;—*A. GLOBOSUM*, China. xxiv, 744;—*A. MEDIUM*, China. xxiv, 747.
- Amor(es) SECO(S)**, Arg. Republ. xxiv, 762.
- Amorpha CANESCENS**, Kansas. xxix, 446.
- Amorphophallus CAMPANULATUS**;—*A. SYLVATICUS*, uses in India, Dymock. xxv, 122.
- **TITANUS** (flowers 34 by 69 inches), Sumatra, Beccari. xxvii, 136.
- Ampelideae**, Mexico. xxiv, 777.
- Ampelopsis HEDERACEA**, analysis of berries, (cont. pyrocatechuic ac.), Gorup-Besanez. xxii, 138—poisonous, Bernays. xxv, 187.
- **QUINQUEFOLIA**, distinct. fr. *Rhus toxicodendron*. xxix, 227—in Kansas. xxix, 452.
- Amygdalin**, fermentat. power destroyed by borax, Dumas. xxi, 400—yields hydrocy. ac. when heated with pea or rye meal, but not with wheat flour, Heuschen. xxi, 387—found in cherry leaves, Rochleder. xix, 257; in sweet almonds, Heuschen. xxi, 387—detect. in vegetable subst. (ferment. with rye meal), Heuschen. xxi, 387—yield fr. diff. substances, Lehmann. xxiii, 437.
- Amygdalin, AMORPHOUS** (laurocerasin), Lehmann. xxiii, 438.
- **CRYSTALLINE** fr. subst. cont. cane sugar and much fat; **AMORPH.** fr. cont. glucose and little fat, Lehmann. xxiii, 439.
- Amygdalus NANA**, Japan, descript., Holmes. xxviii, 179.
- **PERSICA**, Japan, descript., Holmes. xxviii, 179; see also **PEACH**.
- Amyl ALCOHOL**, see **ALCOHOL, AMYLIC**.
- **BROMIDE**, (amyl alc. and hydrobrom. ac.) Hoffmann. xxv, 455.
- **NITRATE**, prop. xxiv, 294.
- **NITRITE**, antidote to chlorof., Bader. xxiv, 294; xxvi, 493—in drowning, suffocating, fainting, Guthrie. xix, 250—constit., Greene. xxvii, 412; object. to Greene, Dott. xxviii, 283—fractions below 90° C. and above 100° C. are physiol. useless; Dott. xxvii, 411—prep. fr. nitrite pot., Maisch. xix, 249; Nietsch. xxix, 299; fr. nitrous ac., Hilger. xxiii, 351; Tanner. xxiii, 352; Rennard. xxii, 236; xxiii, 352—
- Amyl (Continued.)**
preserved by calc. magn. or fus. chlor. calc., Hilger. xxiii, 352—prop. xix, 249.
- Amylen** yields iodoform, Hager. xxx, 346—prop. Etard. xxvii, 414.
- **BIBROM**—, xxvii, 415.
- Amylo-DEXTRIN**, formula, Pfeiffer and Tollens. xxx, 366—combined with alkalies, Pfeiffer and Tollens. xxx, 366.
- Amylopsin** fr. pancreas, Defresne. xxvii, 545.
- Amylum**, etymology. xxiii, 359.
- Amyrin** fr. elemi. xxiii, 217; Flückiger and Buri. xxiv, 283; xxvi, 466.
- Amyris LIGNALOE**, Mexico. xxiv, 768, 777.
- **CARANNA**, Mexico. xxiv, 768.
- Anacardiaceae**. xxiii, 218; xxiv, 193; in Calif. xix, 300; Kansas. xxix, 440.
- Anacardium OCCIDENTALE**, active principle, Buchheim. xxii, 156—poisonous, Fisher. xxix, 222.
- Anacharis CANADENSIS** (*Elodea can.*) induces butyric ferment. in a sol. of cane sugar. xxiii, 371.
- Anacyclus OFFICINARUM** as irritant. xxvi, 229.
- Anagallis ARVENSIS**, in Kansas. xxix, 449.
- Anagyris FOETIDA**, leaves as senna in Greece. xxiv, 189—its odor. xxvii, 208.
- Analysis, FORENSIC** (extr. subst. fr. aqueous sol. with menstr. not miscible with water), Dragendorff. xxvi, 86.
- **MICROPRISMATIC**, Maschke. xxx, 54.
- **OFF-HAND**, Maisch. xxx, 654, 5.
- **PLANT**, proximate, Parsons. xxviii, 100.
- **SPECTRAL**, quantitative, Hüfner. xxiv, 85.
- **by STUDENTS**, Robbins; Sharples. xxiv, 652, 3, 4.
- **VOLUMETRIC**, source of error (salin. sol. contract and expand unequally), Tatlock. xix, 141.
- **WEIGHING** (half ingm. is near enough), Lawrence Smith. xxiii, 111.
- Analysis**, see respective substances.
- Anamirtin**, not poisonous, Barth and Kretschy. xxviii, 348; xxix, 352.
- Anantherix DECUMBENS**, antidote to rattlesnake bites, Wilson. xxiii, 157.
- Anastatica HIEROCHUNTICA**, uses in India, Dymock. xxvi, 164.
- Anchieta SALUTARIS**, Brazil. xxi, 120.
- Anchusa TINCTORIA**, in small-pox, China. xxiv, 744—germinat. of seed, Saunders. xxx, 566.
- Anda ASSU** (açu)—*Johannesia princeps*, Brazil. xxvii, 267.
- **BRAZILIENSIS**, Brazil, prop. and uses of oil. xxvii, 267.
- **GOMESII**, Brazil. xxvii, 267.
- Andira ANTHELMINTICA**, Brazil. xxvi, 294.
- **ARARIBA**, Brazil, descript., Aguiar. xxviii, 184.
- **INERMIS**, Jamaica, account. xxiv, 734.
- **SPECTABILIS**, Brazil. xxvi, 294.
- **VERMIFUGA**, Brazil. xxvi, 294.
- Andrews, Geo. H.** portrait. xxx.
- Andromeda LESCHENAULTII**, India, oil yields salicyl. ac., Broughton. xxv, 291.
- Andropogon CITRATUS**, Mexico. xxiv, 769.
- **NARDUS**, Manila. xxiv, 767.
- **SCHCENANTHUS**, Mauritius. xxiv, 741; see also **OIL CITRONELLA**.
- Anemarrhena ASPHODELOIDES**, China. xxiv, 748.
- Anemone CERNUA**, Japan. xxviii, 100; descript., Holmes. xxviii, 163.
- **CYLINDRICA**, Kansas;—*A. INDIAN*—*a. cylindr.* xxix, 449.
- **LUDOVICIANA**, constit., Miller. xxii, 127.
- **PRATENSIS**, see **PULSATILLA**.
- **RUE**—, *Thalictrum anemonoides*. xxix, 450.
- **VIRGINIANA**, Kansas. xxix, 449.
- Anemonin**, poisonous; relation to cantharidin, Basiner. xxx, 328.
- Anemopsis CALIFORNICA**, Palmer. xxvii, 284—analysis, Lloyd. xxviii, 103.
- Anethol**, constitution, Landolph. xxiv, 281; Perrenoud. xxvi, 444.
- Anethum GRAVEOLENS**, germination of seeds, Saunders. xxx, 366.
- **SOWA**, uses in India. xxiv, 721.
- Angelica (ARCHANGEL.)** adult. (roots of Ligust. actæif.; Hierac. lan.; Imperat.), Miller. xxiii, 177; 497—adult. of powd. xxx, 576—analysis, Brimmer. xxv, 170—cultivat. in France. xxx, 209—germinat. of seeds, Saunders. xxx, 566.

- Angelica** CYMPTERIS, Calif. xix, 302.
"Angelica" Utah.—*Ligusticum apiifolium*. xxvii, 193.
Angelicin, Brimmer. xxv, 170.
Angelim AMARGOSO, Brazil (Araroba tree). xxvi, 294; xxviii, 182.
 — DOCE—*Andira vermiculata*, Brazil. xxvi, 294.
 — PEDRA—*Andira spectabilis*, Brazil. xxvi, 294.
Angier, Mayor of Atlanta, address of welcome. xxvi, 839.
Angiopteris ERECTA contains spheroids. xxvii, 443.
Anguilla PEKRINENSIS, as source of Chinese isinglass. xxii, 172.
Anguay DO GUARANI, balsam fr. pods of *Myroxylon peruifer*, Brazil. xxvii, 242.
Angræcum FRAGRANS, microscop. charact., Paschikis. xxix, 131.
Angostura, TRUE, bark, adult. Maisch. xxii, 306—microscop. examin., Cazeneuve. xxiii, 188.
 — FALSÆ—*Esenbeckia febrifuga*, Oberlin and Schlagdenhauffen. xxiii, 190, 497—analysis, Shenstone. xxvi, 212.
 — BITTERS, imitat., Davidson. xxvi, 150.
Anhydro-ATROPINE (=atropyltropine), Ladenburg. xxx, 424.
 — TROPINE, Ladenburg. xxix, 337.
Anicillo—*Schkuhria abrotanoides*, Mexico. xxiv, 777.
Anilin, act. of metallic ferri-cyanides, Bong. xxvi, 369—solvent for indigotin, Agnier and Baeyer. xix, 273—distinct. fr. naphthylamin, Lupton. xxiv, 369—difficulty of preparing pure, Rosenstiehl. xxiv, 368—and chloride sulphur, Hamlet. xxii, 273—act. of vanadium salts, Guyot. xxiv, 369.
 — ATOMS, can not be formed, Wood. xxvii, 523.
 — BLACK, Guyot. xxiv, 369.
 — CHLORATE, prep. xxiii, 431.
 — COLORS, adult. (sugar). xxi, 139; sugar and oxalic ac. (only 25 p. c. color). xxiii, 514—cont. up to 6 p. c. arsenic. xxiii, 513; detect. of arsenic, Rieckher. xviii, 250—without arsenic (Couper's process). xxiii, 428—directions for dyeing, Shuttleworth. xxi, 143—color-value estimat. (hyposulph. sod.) Stamm. xxii, 274—solubl. in glyc. xxi, 344—history, Perkins. xix, 223—yield. xix, 222.
 — FERRI-CYANIDE, Wehrlin. xxiii, 431.
 — FERROCYANIDE, Schlumberger. xxiii, 430—prep., prop., Wehrlin. xxiii, 430.
 — NITRATE, Jegel. xxiii, 429.
 — OXETHEN, Dernole. xxiii, 274.
 — RED, see FUCHSIN.
 — SULPHATE, act. of oxidiz. agents, Jegel. xxiii, 430.
Animal ORGANISM, a peculiar alkaloid, Schreiner. xxvii, 521.
Anime, solubl. in eucalypt. oil, Osborne. xxvii, 234.
Anise, adult. (fennel; conium, nigella). xix, 276; xxiii, 497; (clay). xxiv, 404; (conium), Pohl. xxvi, 247—and conium may produce bastards, Pohl. xxvi, 247.
 — STAR—, see STAR ANISE.
Anisoin, constitution, Pierrenoud. xxvi, 444.
Anjurah (Persian)=seed of *Acanthodium spicatum*, India. xxviii, 124.
Ankool=rootbark of *Alangium Lamarckii*, India. xxvii, 237.
Ankota=the same.
Ankynaros=*Cynara scolymos*, Greece. xxvi, 230.
Annatto adult. (85 p. c. residue). xix, 333—analysis and prep. of coloring matter, Stein. xviii, 290—coloring power, Küpfer. xxiv, 382—in Jamaica. xxiv, 736.
Anogeissus LATIFOLIUS, gum, behav. to reagents, Masing. xxix, 213.
Anonaceae. xxii, 127; xxvi, 250; xxix, 189.
 — contain berberin, Parsons. xxx, 434.
Ansu=*Prunus armeniaca*, Japan. xxviii, 179.
Ant, HONEY—, Mexico, account, Saunders. xxi, 648; xxii, 171.
Antennaria PLANTAGINIFOLIA, Kansas. xxix, 442.
Anthemis ARVENSIS, worthless as insect powder, Kalbrunner. xxiii, 166.
 — COTULA, the same.
 — NOBILIS, the same—see CHAMOMILE, ROMAN
Anthemis PYRETHRUM, as irritant. xxvi, 229.
 — TINCTORIA, worthless as insecticide, Kalbrunner. xxiii, 166.
Anthocercia, Müller and Rummel. xxvii, 519.
Anthocercis VISCOSA, Australia. xxvii, 519.
Antholeucin fr. *Bellis perennis*, Enz. xviii, 280.
Anthoneron=Orange-flower water, Greece. xxvii, 64.
Anthoxanthum ODORATUM, ergot, Wilson. xxiv, 120.
Bnthraceen, fr. residual pitch of coal tar, Fenner and Versmann. xxii, 212.
Anthrachinon, Græbe and Liebermann. xxiii, 457.
Anthrachryson, fr. dioxybenzoic ac., Barth and Senhofer. xxi, 360.
Anthriscus CEREFOLIUM, analyzed, Gutzeit. xxviii, 160—fruit cont. alc., Gutzeit. xxiv, 287.
Antiaris TOXICARIA, descript. xxvi, 308.
Anticlea FREMONTII in Calif. xix, 307.
Antidote, MULTIPLE (hydr. iron, magn., charcoal) Jeannel. xxv, 114.
 — to CYANIDES and metallic poisons (oxysulphid. iron, magn.), Nietsch. xxix, 86.
Antidote-cacoon—*Feuillea cordifolia*, Jamaica. xxiv, 732.
Antihydropin, fr. *Blatta orientalis*, Bogomolow. xxvii, 286.
Antilope DORCAS, musky excrements, Bertherand. xxvi, 332—analyzed, Jacquême. xxvi, 332.
Antimonial preparations, test for arsenic, Biltz. xviii, 227; Williams. xxiii, 303.
Antimony, xviii, 240; xix, 217; xxi, 312; xxii, 204; xxiii, 303; xxiv, 259; xxv, 265; xxvi, 416; xxvii, 367; xxviii, 249; xxix, 274; xxx, 304.
Antimony, separat. fr. arsenic in analysis, Bunsen. xxvii, 365; Reinsch's test fallacious, Wormley. xxviii, 250; sublimed cryst. distinct. fr. arsenic, Wormley; Maisch. xxviii, 250—atomic weight, Kressler. xxviii, 249—in California. xxvii, 585, 621; xxix, 274—artificial crystals, xviii, 305—estimation (in alloys and ores) sulphide convert. into antimon. of antim. oxide, Bartley. xxvi, 416; xxvii, 367; (in presence of tin) iod. pot., Herrowen. xxx, 304—reduct. as a black, impalpable powder, Boettger (butter antimony, water, alumin. wire) xxix, 275—act. of trimethylamin upon salts of antim., Vincent. xxv, 315.
 — ARSENIATE, Hager. xxi, 312; Dutch Phar. Soc. xxx, 304.
 — ARSENIDE, Deschamps. xxvii, 367.
 — BLACK, see ANTIMON. SULPHIDE.
 — OXY-CHLORIDE prep., Schaeffer. xix, 217; MacIvor. xxiv, 259.
 — PENTACHLORIDE is a solid, melts at 21° F., Kämmerer. xxiv, 259.
 — and POTASSIUM TARTRATE, see TARTAR EMETIC.
 — SULPHIDE, BLACK, adult., up to 40 p. c. quartz. xix, 217, 341; xxi, 312, 488; 39 p. c. sand, 60 p. c. coal, Castelhan. xxii, 314; suspicious price. xxiv, 394; anthracite, black lead, Markoe. xxiv, 650; xxv, 354—analysis of commercial, Sheffield. xxiv, 415; xxv, 265.
 — SULPHIDE, GOLDEN, fr. Schlippe's salt contains free sulphur, Wurtz. xix, 217.
 — TARTRATES, constitution, Clark and Stalls. xxix, 318.
 — TERCHLORIDE, act. upon alkaloids, Godeffroy. xxvi, 559.
 — TRIBROMIDE, MacIvor, xxiii, 305.
Antiseptics, Garrison. xxiv, 688—compar. value, Buchholz. xxvi, 443—are only so for certain substances, Maisch. xxx, 620—boroglyceride, Barff. xxx, 358—cinnamic ac., cinnamate sod., xxx, 385, 6—liquid fr. lava, Harteloup. xxx, 91—ozonized oil turpentine, Kingzett. xxx, 321—salicylic aldehyde, Apéry. xxx, 387—Péanès, salicyl. ac., quin., aloes. xxx, 99—Sendner, cinch., alum, opium, benzoës. xxx, 91.
Antozone, (Schönbein) is peroxide of hydrogen, Engler and Nasse. xix, 176.
Anub-us-SALIB (Persian)=fruit of *Solanum nigrum*. xxviii, 120.
Anvula *Phyllanthus emblica*, India. xxviii, 194.
Aomla=*Emblica officinalis*, India. xxiv, 718.
Aood-i-BALASAN=wood of *Balsamodendron opobalsamum*, India. xxvi, 165.

- Apeina** of Brocamont. xxv, 376
Apiaconia, Wright and Luff. xxvii, 511.
Apio; **APIO CIMARRON**; **APIO SILVESTRE**, Arg. Republ. xxiv, 762, 3, 4.
Apiol (=parsley oil camphor) prep., prop., Gerichten. xxv, 319.
 — (Joret and Homolle) chiefly vol. oil and soft resin, Whitney. xxviii, 349—prep. by benzin, Wolff. xxv, 319—manuf. in Portugal, Gragera. xxv, 375.
Apios TUBEROSA, uses in U. S., Palmer. xxvii, 258—found in Kansas. xxix, 447.
Apis DORSATA, India. xxiv, 724.
Apium GRAVEOLENS, descript. and uses in India, Dymock. xxvii, 192.
Aplopappus DISCOIDEUS. xxiv, 187; xxix, 206; in Mexico. xxix, 774.
Aplotaxis AURICULATA, India, account, Cooke. xxvi, 224.
 — **COSTUS**, uses in India, Dymock. xxvi, 161—descript.; contains inulin, Flückiger. xxvi, 226, 7.
 — **LAPPA**, yields the costus of the ancients, Jackson. xxi, 224.
Apocodeia, history. xxi, 374—of Mathiessen and Burnside, a decomp. product, Wright. xxii, 266—physiolog. act., Ott. xxvi, 277.
Apoconitia, Wright and Luff. xxvii, 511.
Apocynaceae. xviii, 278; xix, 286; xxi, 221; xxii, 110; xxiv, 136; xxv, 148; xxvi, 212; xxvii, 168; xxviii, 136; xxix, 149; xxx, 179; of California. xix, 305; Kansas. xxix, 440; Mexico. xxiv, 773.
Apocynum ADDROSÆMIFOLIUM, microscop. charact., Mannheim. xxx, 179; Stuart. xxix, 469; Maisch. xxix, 516—substit. by *Ap. cannabin.* xxiii, 501.
 — **CANNABINUM**, examin. of precip. in alc. prep., Lloyd. xxvii, 168—microscop. charact., Mannheim. xxx, 179; Stuart. xxix, 468; Maisch. xxix, 516—found in Kansas. xxix, 440; in Utah. xxvii, 168.
Apomorphia, behav. to reagents, Quehl and Köhler. xxii, 266—estimat. (bism. and pot. iod.), Thresh. xxviii, 320—German differs fr. English, Blaser. xxi, 376—history. xxi, 373—physiolog. act., Ott. xxvi, 277—prep. Phar. Soc. Paris. xxv, 301; fr. codeia, Mathiessen and Wright. xix, 225; fr. morphia, Hadler. xxii, 265—prop., Oberlin. xxiii, 395; Patrouillard. xxvi, 563—insoluble in ether and chloroform, salts soluble, Merck. xxvii, 487—stable solut. (syrup, exclusion of air), Blaser. xxi, 376.
 — **MURIATE**, xxviii, 368—hypoderm. sol., Powers. xxvii, 92.
Apopseudaconia, comp., Wright and Luff. xxvii, 509.
Apopseudaconitia, comp., Wright and Luff. xxvii, 509.
Apoquinamin, Hesse. xxvi, 568.
"Apothecary," history and account, Patten. xxii, 343.
 — convicted on a female syringe. xxii, 333.
Apparatus for LABORATORIES, Corder. xxv, 46; Enders. xxiii, 26.
 — **STAND**, Robbins. xxvii, 56; Squibb. xxi, 532; xxii, 41.
Apple SEEDS, yield of amygdalin. xxiii, 437.
 — **TREE GUM**=*Eucalyptus Stuartiana*. xxiv, 806.
Apprenticeship, Colcord. xix, 418; Becker. xxiv, 452.
Apprentices, preliminary education. xx, 145; Parrish. xx, 173.
 — suggestion to beginners in pharm., Procter, Jr. xxi, 523.
Apricot preserved in Cyprus, Landerer. xxiv, 188.
Apsifra, Greece—*Absinthium*. xxx, 191.
Aqua CAPPADOCIA, Langbeck. xxiv, 64.
 — **FERRI PHOSPHATIS ALBI** (sod. phosph., chlor. iron), Dutch Phar. Soc. xxx, 100.
 — **TRAUMATICA**, Seudneri. xxx, 91.
 — for the remainder see **WATER**.
Aquaria CEMENT (shellac, pumice; sulphur). xxv, 116.
Aquifoliaceae. xxi, 258; xxiv, 200; xxvi, 299; xxix, 233; in Kansas. xxix, 440.
Aquilaria AGALLOCHUM, China, account. xxiv, 755.
Aquilegia CALIFORNICA. xix, 298.
 — **CANADENSIS**, in Kansas. xxix, 449.
Arabin, prop., Barfoed. xxiv, 313—test (mur. ac. orcin.), Reichl and Breinl. xxx, 367—fr. beet, Scheibler. xxii, 245.
Arabinose ident. with lactose; fr. gum arabic, Kiliani. xxix, 311—fr. *Fucus amylaceus*, Greenish. xxx, 139.
Arabis BLEPHAROPHYLLA in Calif. xix, 299.
 — **CANADENSIS** in Kansas. xxix, 443.
Araceae. xxi, 262; xxviii, 102; of Calif. xix, 307; Kansas. xxix, 440.
Arachis HYPOGAEA, see also *Peanut*. xviii, 285; xxii, 151—seeds cont. no cryst. albumin, Ritt-hausen. xxx, 449—in China. xxv, 236—Jamaica. xxiv, 732.
Aralia CALIFORNICA. xxvi, 698.
 — **CORDATA**, Japan. xxviii, 161.
 — **EDULIS**, China. xxiv, 756—Japan, descript.. Holmes. xxviii, 161.
 — **NUDICAULIS**, distinct. fr. *Rhus toxicod.* xxix, 227.
 — **PALMATA**, China. xxiv, 750.
 — **PAPYRACEA**, Formosa, descript. and uses, Hooker and Greene. xxvii, 194.
 — **PAPYRIFERA**, China, medicin. uses of pith, xxiv, 755.
 — **QUINQUEFOLIA**, distinct. fr. *Rhus toxicod.* xxix, 227.
 — **SPINOSA**, analysis, Elkins; Holden. xxix, 168.
Araliaceae. xxiii, 177; xxiv, 155; xxvii, 194; xxviii, 161; xxix, 168; of Calif. xix, 302.
Araliin, fr. *Aralia spinosa*. Holden. xxix, 168.
Araliretin fr. *Aralia spinosa*, Holden. xxix, 168.
Araroba, histology, Greenish. xxviii, 184—history, McMillan. xxvii, 473—review, Bullock. xxvi, 295—source: *Andira araroba*, Aguiar. xxviii, 182; probably fr. *A. centrolobium*, Holmes. xxiii, 214; fr. *Angelim amargoso*, Monteiro. xxvi, 294—account, Lima. xxiii, 213—xxviii, 372.
Ara-RUTA ("mealy root")—arrowroot. xxv, 129.
Arasina GURGI=gamboge, India, descript., Dymock. xxv, 183.
Arayan Arg. Republ. xxiv, 761, see **ARRAYAN**.
Arbol DE LA ESPERMA, Arg. Republ. xxiv, 762.
Arbor SEGUISAN—Ylang-ylang, Manila. xxix, 189.
 — **VITAE**, leaves in small-pox in Belgium. xxi, 262.
Arbusto, Arg. Republ. xxiv, 762.
Arbutin, act. of heat, Schiff. xxix, 350—found in *Kalmia latifolia*, Kennedy. xxiii, 164—yields methyl-hydrochinon, Hlasiwetz and Habermann. xxiii, 440.
Arbutus MENZIESII, Calif. xix, 303; xxvii, 601.
Arca, Arg. Republ. xxiv, 763.
Arcenthrobium CAMPHYLOPODIUM, mistletoe on black spruce. xxvi, 247.
Archepin, gum, Mexico. xxiv, 768.
Archil, adult. (fuchsin residue) Hock. xxiv, 407—manufact. (liquor; paste; blue) xxiii, 124, 5.
Arctium EDULE, Japan. xxviii, 746.
 — **LAPPA**, Japan, descript., Holmes. xxviii, 145.
 See also **BARDANA**, **BURDOCK**.
Arctostaphylos GLAUCA, in Calif. xix, 303; xxvi, 698—cont. arbutin, Flint. xxi, 223.
 — **NUMMULARIA**, Calif. xix, 303.
 — **PUNGENS**, Calif. xix, 303; Mexico. xxiv, 774.
 — **TOMENTOSA**, Calif. xix, 303; xxvii, 175.
"Arctusine" (Bear's grease). xxiv, 827.
Ardea CINEREA;—*A. EGRETta*, use of fat in Greece. xxvi, 502.
Areca CATECHU, descript. and uses. xxvi, 186; Jackson. xxiii, 127; in India. xxiv, 718; Jamaica. xxiv, 735.
Areca nuts, see **BETEL NUTS**.
Areometer, normal, Hirsch. xxv, 36.
Argania SIDEROXYLON, Morocco, food plant, Hays. xxvii, 172.
Argemone MEXICANA, descript. and uses in India, Dymock. xxv, 194—in Kansas. xxix, 448—Mauritius. xxiv, 741.
Argentine REPUBLIC, Centennial Exhib., drugs. xxiv, 761; pharm. prep. 813—pharmacy, Wheeler. xxiv, 441.
Argento-ANTIMONIOUS TARTRATE, Cooke. xxix, 318.

- Argentum PLUMBO-NITRICUM**, Sawosticki. xxviii, 48.
Argentum, see **SILVER**.
Argols. xxiii, 197; xxiv, 335; fr. Greek wines, utilizat. Landerer. xxix, 317.
Argylicas HUIDOBRIANA, Chili. xxiv, 766.
Argyreia SPECIOSA, descript. and uses in India, Dymock. xxv, 145.
Aricina, history, Hesse. xxiii, 402—and paricina. Hesse. xxvii, 497, note—of Pelletier and Cariol is identical with cinchonidia, cusconia, cinchovatina, Hesse. xxv, 29, 305—in cuprea bark, Hesse. xxx, 203—does really exist, Howard. xxiii, 417—is emetic Howard xxvii, 497.
Arisaema DRACONTIUM; — **A. TRIPHYLLUM**, in Kansas. xxix, 440.
Aristolochia BRACTEATA, descript. India, Dymock. xxv, 131.
 — **CALIFORNICA**. xix, 305.
 — **CYMBIFERA**, Brazil. xxiii, 121.
 — **ÆTIDA**; — **A. GRANDIFLORA**, Mexico. xxiv, 771.
 — **INDICA**, descript. and uses, India, Dymock. xxv, 130.
 — **LONGA**, descript. and uses, India, Dymock. xxvii, 116.
 — **MEXICANA**, Mexico. xxiv, 771.
 — **RECURVILABRA**, in China. xxi, 209.
 — **ROTUNDA**, descript. and uses in India, Dymock. xxviii, 116—in snake bites, Modlen. xxix, 133.
 — **SIPHO**, Kansas. xxix, 440.
Aristolochiaceae. xxi, 209; xxiv, 128; xxv, 130; xxviii, 116; xxix, 133; Calif. xix, 305; Kansas. xxix, 440; Mexico. xxiv, 771.
Aristotele MAQUI, Chili. xxiv, 766.
Ark—**ABU** = *Daucus crinitus*, Morocco. xxiv, 114.
 — **EGORDY** (Igudu) spec. of aristolochia, Morocco. xxiv, 114.
Arkan (Persian-Greek) — *Lawsonia alba*. xxvii, 238.
Arkansas, Pharmacy Law. xxi, 376, 379.
Arkeftos — *Juniperus phoenicia*, Greece. xxx, 252.
Armeria MAURITANA, Morocco. xxiv, 114.
 — **VULGARIS**, Calif. xix, 304.
Arneudos — *Juniperus phoenicia*, Greece. xxx, 252.
Arnica CORDIFOLIA, Calif. xix, 303.
 — **MONTANA**, flowers, drug market. xix, 397; xx, 122; xxvii, 558, 560; xxviii, 372; xxix, 372; xxx, 464—poisonous prop., Schumann. xviii, 280; Wilms. xxiii, 166.
 — **MONTANA**, leaves, loss in drying. xxi, 202—root, adult., Holmes. xxii, 3 6—cont. volatile oil and isobutyric acid, Erlenmeyer and Siegel. xxii, 117.
 — **PARVIFLORA**, Calif. xix, 303.
Aro—*Premna latifolia*, Fiji. xxx, 146.
Aroideae xxv, 122; xxvi, 180; xxvii, 136; xxix, 118; xxx, 146.
Aroogay bark, India. xxiv, 716.
Arrajan, Chili—*Eugenia spiculata* xxiv, 765, see **ARAYAN**.
Arrangement, see **COMMITTEE** and **REPORT**.
Arrayan, Mexico—*Myrtus arrayan*. xxiv, 775, see also **ARAYAN**; **ARRAJAN**.
Arrhenatherum AVENACEUM, ergot, Wilson. xxiv, 120—in Calif. xxvii, 604.
Arrope, for Malaga wine. xxvi, 262.
Arrowhead—*Sagittaria variabilis*, Kansas. xxix, 439.
Arrowroot, (*Maranta*), adult. xxx, 576; Greenish. xxv, 129; Madsen. xxiv, 404—descript., Reed. xxvi, 505—etymology. xxiii, 359; xxv, 129—objects to name as too commonly appl., Greenish. xxv, 129—microscop. distinct., Harrington. xxiv, 310—gelatinizing test (mur. ac. test) of Ph. Germ. unreliable, Calmburg. xxiii, 136; xxiv, 125, 6—test for wheat starch (hot water), Boettcher. xviii, 263.
 — **BERMUDA**, history, cult., xxiv, 739—mur. ac. test, Calmburg. xxiv, 126—fraudulent (worthless import., and export. as genuine). xxi, 433.
 — **BRAZILIAN** (Manihot) mur. ac. test, Calmburg. xxiv, 126—examin., Ludwig. xix, 294—see also **MANIHOT**.
 — **CANNA**, miscrop. charact., Harrington. xxiv, 310.
 — **CAPE COAST CASTLE**. xxiv, 741.
 — **CURCUMA**, microsc. charact., Harrington. xxiv, 310—mur. ac. test, Calmburg. xxiv, 126.
Arrowroot, EAST INDIA, mur. ac. test, Calmburg. xxiv, 126.
 — **FLORIDA** fr. *Zamia integrifolia*. xxvii, 280.
 — **INDIA**, see **A.**, **CURCUMA**.
 — **JAMAICA**, mur. ac. test, Calmburg. xxiv, 126.
 — **JAVA**, mur. ac. test, Calmburg. xxiv, 126.
 — **MANIHOT**, see **A.**, **BRAZILIAN**.
 — **NATAL**, diff. in behav. to reagents, Greenish. xxiv, 127—microscop. charact., Hansel. xxvii, 145—mur. ac. test, Calmburg. xxiv, 126.
 — **NEW SOUTH WALES**. xxiv, 738.
 — **PARKHILL**, mur. ac. test, Calmburg. xxiv, 126.
 — **PORTLAND**, microscop. charact., Harrington. xxiv, 310.
 — **ST. VINCENT**, mur. ac. test, Calmburg. xxiv, 126.
 — **TACCA**, microscop. charact., Harrington. xxiv, 310.
 — **WEST INDIA**, mur. ac. test, Calmburg. xxiv, 126.
Arrow Wood - *Viburnum dentatum*. xxvi, 243.
Arrudo DO MATTO *Xanthoxylon Peckoltianum*, Brazil. xxiv, 165.
Arsenic. xviii, 227; xix, 218; xxi, 310; xxii, 204; xxiii, 301; xxiv, 257; xxv, 263; xxvi, 412; xxvii, 363; xxviii, 247; xxix, 271; xxx, 303.
 — adult. xix, 341—is assimilated by particular organs, nerve tissue, Scolsuboff. xxvi, 412—in animal organism, liver the best object, Ludwig. xxviii, 249—antidotes: sugar, magnes., Carl. xxii, 204; magn., Hoglan. xxix, 274; sol. sacch. ox. iron, Köhler. xviii, 235; chlor. iron, bicarb. sod., McCaw. xxix, 274; dialyzed iron, Mattison. xxvi, 118; Ph. Germ., more expedit. than U. S. Ph., Wilder. xxvi, 415—in California. xxvii, 585—ESTIMATION: as pyroarsen. magn., Brauner. xxvi, 413; ferrous chlor., mur. ac., Fischer. xxix, 272; nitr. silv., Fletcher. xxix, 272; nitric, sulph. ac., Gautier. xxv, 264; improvement on Gautier—Chittenden and Donaldson. xxix, 273; Marsh's test, accurate enough; precautions, Gauthier. xxiv, 258; acet. uran., Millot and Maguene. xxvii, 363; nitr. silver, Reichardt. xxix, 271; as chloride, Selmi. xxviii, 248; in sulphur, (nitr. silv.), Schæppi. xxx, 303—from anilin color residue (lime and coal), Winckler. xxv, 265—fusing of metallic, Mallet. xxi, 310—keeping bright. xix, 218—chemical causes of its poisonousness, Binz and Schulz. xxvii, 363; xxviii, 249—separat. fr. antimony in analysis, Bunsen. xxvii, 365; fr. other metals, Clermont and Frommel. xxvi, 413—found in soot fr. coal, Reinsch. xxi, 311—TESTS: Bettendorf, protochlor. tin. xxi, 311; Davy, sod. amalgam, nitr. silv. in Marsh's test. xxiv, 257; xxv, 263; Hirschberg, Reinsch's test reliable xxvi, 414; Mayençon and Bergeret, zinc, corr. subl. xxiii, 301; Wittstein, as magn.-am. arseniate. xxiii, 302; Patrouillard (in alkaline salts) reduce with oxal. ac. xxv, 265—test: in antimonial and bismuth prep. (nitr. sod., nitr. silv.), Biltz. xviii, 227; in presence of antimony (soda, alumin., nitr. silv.), Gauthier. xxi, 310; (alloy with potassium, water), Williams. xxiii, 303; in muriat. ac., (protochlor. tin) Bettendorf. xix, 218; (drop on thick tinfoil, heat), Hager. xxviii, 248; in colored paper, fabric, etc. (copperfoil and sublimate), Christel. xxiii, 301; (chlorate pot., ignite) Kupferschläger. xxiv, 258.
 — See also **ACID**, **ARSENIOUS**.
 — **BROMIDE**, solut. (liqueur Clémens.) xxv, 89.
 — **FLUORIDE**, MacIvor. xxiii, 303.
 — **HYDRIDE** (electr. discharge and arsen. hydrog.), Ogier. xxviii, 230.
 — **IODIDE**, prep., Babcock (arsen. ac., hydriod. ac.) xxiii, 693, 829; Bamburger, Philipp (Nickel's proc. best.) xxx, 303—(arsen. ac., mur. ac., iod. pot.) xxx, 303.
 — **SULPHIDES**, compound with iodine, Schneider. xxx, 302.
Arsenides, METALLIC, Deschamps. xxvi, 415; xxvii, 366.
Arsenolite, California. xxvii, 586.
Arseno-MOLYBDATES, Debray. xxiii, 299.
Artanthe ADUNCA, as matico. xxiii, 646.
 — **ELONGATA**, silicified cells. xxx, 248.

- Artanthe LANCEFOLIA**, as matico. xxiii, 646.
 — **MOLLICOMA**, as Jaborandi, Brazil. xxiv, 162.
Artemisia, review of Am. spec., Maisch. xxviii, 144.
 — **ABROTANUM**, China. xxiv, 746.
 — **ABYSSINICA**, Abyssinia. xxvii, 176.
 — **ARBUSCULA**. xxviii, 144.
 — **CALIFORNICA**. xix, 303.
 — **CAPILLARIS**, Japan, descript., Holmes. xxviii, 145.
 — **DRACUNCULOIDES**. xxviii, 144—Californ. xxvii, 176.
 — **DRACUNCULUS**, yield of oil, France. xxvii, 380.
 — **FILIFOLIA**. xxviii, 144—California. xix, 303; xxvii, 176.
 — **INDICA**, descript. and uses in India, Dymock. xxviii, 144.
 — **LUDOVICIANA**. xxviii, 144—California. xxvii, 176—Kansas. xxix, 442.
 — **MEXICANA**, Mexico. xxiv, 774.
 — **MINIMA**. xxviii, 144.
 — **STERNUTATORIA**, descript. and uses in India, Dymock. xxviii, 144.
 — **TRIDENTATA**. xxviii, 144—California. xxvii, 176.
 — **TRIFIDA**. xxviii, 144.
 — **VULGARIS**, Kansas. xxix, 442.
Arthanitin, fr. *Cyclamen europ.* and *Primula veris*. xxviii, 163—prop., Luca. xxv, 316; see also **CYCLAMIN**.
Artichoke, leaves in rheumatism, Copeman. xxiii, 167.
 — **JERUSALEM**—*Helianthus tuberosus*. xxviii, 146; xxix, 442.
 — See also **MIXTURE**.
Artocarpus INTEGRIFOLIA, India. xxiv, 716.
Arum, adult. of powd. xxx, 576.
 — **MARGARITIFERUM**, descript. and uses in India, Dymock. xxix, 119.
 — **PENTAPHYLLUM**, China. xxiv, 758.
 — **TRIPHYLLUM**, Ohio. xxviii, 503.
 — **VENENATUM**, arrow poison of Guiana. xxi, 262.
Arundo PHRAGMITES, manna, Utah. xxvii, 137.
Arvore DE CONGONHA—*Ilex paraguayensis*, Brazil. xxvi, 299.
Asa—*Morinda tomentosa*, India. xxv, 163.
 — **FOETIDA**, adult. xix, 332; xxi, 477; xxiii, 497; xxx, 576; suspic. price. xxiv, 394—behavior to reagents, Hirschsohn. xxvi, 453—drug market. xix, 403; xx, 122; xxi, 436; xxii, 626; xxv, 348; xxvi, 656; xxvii, 560; xxx, 467—powder (sugar of milk), Bibby. xxiv, 96—purif. (paste with alc., strain, evap.), Dieterich. xxvii, 397— and vanilla are linked together, Tiemann. xxiv, 382—*Asa* vs. *Assa*, Miller. xxiii, 178—of Bombay market, Dymock. xxiii, 178.
Asagraea OFFICINALIS, alkaloids (veratr., cevad., cevadill.), Wright and Luff. xxvi, 593.
Asarene, constitution, Power. xxviii, 479.
Asarite, constitution, Power. xxviii, 468.
Asarol, constit., Power. xxviii, 475.
Asaron, Power. xxviii, 469.
Asarum CANADENSE, adult. of powder. xxx, 577— constituents of root, Power. xxviii, 464; xxix, 134—history, Power. xxviii, 465—preparations, Gorder. xxiv, 128—in Kansas. xxix, 440.
 — **EUROPEUM**. xxix, 134.
 — **HOOKERI**, Calif. xix, 305.
 — **SIEBOLDII**, Japan, descript., Holmes. xxviii, 116.
Asauna—*Briedelia montana*, India. xxv, 225.
Asbardo—*Kleinia pteroneura*, Morocco. xxiii, 167.
Asbestos, stopper for combustion tubes, White. xxx, 55—its uses. xxvi, 362—in California. xxvii, 586.
Asclepiadaceae. xxiii, 157; xxx, 178; of Calif. xix, 305; Kansas. xxix, 440; Mexico. xxiv, 773.
Asclepias CORNUTI, yields caoutchouc of commercial value. xxiii, 157; Saunders. xxiii, 655; xxiv, 139—descript. and constituents of rhizome, Hinchman. xxx, 178—in Kansas. xxix, 440.
 — **CURASSAVICA**, descript. and uses in India, Dymock. xxvi, 163.
 — **ERIOCARPA**;—**A. PASCICULARIS**, in Calif. xix, 305.
 — **INCARNATA**, constituents, Taylor. xxiii, 157—in Kansas. xxix, 440.
Asclepias LINEARIS;—**A. SETOSA**, Mexico. xxiv, 773.
 — **TUBEROSA**, 80 years ago. xxvi, 849—constituents of root, Clabaugh. xxx, 178—germination of seed, Saunders. xxx, 566—in Kansas. xxix, 440.
 — **VERTICILLATA**, in Kansas. xxix, 440.
 — **VINCETOXICUM**, descript. of root, Holmes. xxvii, 216—decoct., opalescent while hot, transp. when cold, Feneuille. xxvii, 218—prop., Patrouillard. xxiv, 178.
Asfrak—tops of a spec. of *Delphinium*, India. xxvi, 161.
Asgund—*Physalis somnifera*, India. xxiv, 724; xxvi, 160.
Ash BLUE—*Fraxinus quadrangulata*. xxix, 448.
 — **PRICKLY**, adult. of powd. xxx, 576—80 years ago, xxvi, 849, see also **XANTHOXYLUM**.
 — **RED**—*Fraxinus pubescens*. xxix, 448.
 — **WHITE**—*Fraxinus americana*. xxix, 448.
Ashvagandsha—root of *Physalis somnifera*, India. xxvi, 160.
Asparagin, act. of ammon. copper, Löw. xxvii, 356; of molybdate ammon., Buckingham. xxi, 369—decomp. into succin., and aspart. ac. by light, Mercadante. xxiv, 371—estimat., Meunier. xxx, 443—in root of *Althaea rosea*, Claassen. xxx, 217.
Asparagineae. xxiii, 130; xxv, 126.
Asparagus, sugar found chiefly in the lower portion, Humbach. xxii, 100—examn. of berries, Reinsch. xix, 295.
 — **ASCENDUS**, descript. India, Dymock. xxv, 126.
 — **LUCIDUS**, Japan, descript., Holmes. xxviii, 109—sphero-crystals of glucose in tubers, Braun. xxvii, 443.
 — **RACEMOSUS**;—**A. SARMENTOSUS**, India. xxv, 126.
Asphalt, soluble in eucalyptus oil, Osborne. xxvii, 234—nature of American, Newberry. xxi, 449—deposit in New Jersey, Goldsmith. xxviii, 271.
Asphodelus BULBOSUS, uses in Greece, Landerer. xxiv, 123; xxx, 151.
 — **RACEMOSUS**, uses in Greece. xxiv, 123—Morocco. xxiii, 133—Turkestan. xxi, 209.
 — **TENUIFOLIUS**, Morocco. xxiv, 114.
Aspidium BAROMETZ, source of Pakoe-Kidang. xxii, 98.
 — **CALIFORNICUM**. xix, 307.
 — **FILIX**, Chili. xxiv, 766.
 — **MARGINALE**, descript. Cressler; Maisch. xxvi, 178; Kennedy. xxviii, 462—analysis, Patterson (cont. filicic ac.) xxiv, 121.
 — **MUNITUM**, Calif. xix, 307.
 — **RIGIDUM**, analysis, Bowman. xxx, 146.
 — See also **FILIX**.
Aspidosperma QUEBRACHO, Brazil, account, Penzoldt. xxviii, 137—xxx, 184.
Aspidospermatine, Hesse. xxx, 184, 5.
Aspidospermina, physiol. act., Penzoldt. xxviii, 137; Gutmann. xxx, 421—constit., Hesse. xxx, 184, 5 differs accord. to the spec., Fraude. xxviii, 339—ident. with paytin, Wulf-berg. xxix, 345; denied, Hesse. xxix, 346—test: (perchloric ac.), Fraude. xxviii, 322.
Aspidosamine, Hesse. xxx, 184, 5.
Asplia LATIFOLIA, Liberia, descript., Holmes. xxvi, 168.
Aspirator Müncke. (double), xxvi, 57—Proctor, modif. of Smith. xxv, 45—Richards, xxv, 44; Smith. xxv, 45.
Assistant pharmacists, Balluff. xxii, 353—personal responsibility, Maisch. xxii, 473—salary, Rittenhouse. xxii, 355.
Association, American Pharmaceutical, review, Bedford. xxx, 583; Markoe. xxiv, 703.
 — **PHARMACEUTICAL**, what they should be composed of, Moore, Tufts. xx, 110.
 — **PHARMACEUTICAL**, who send delegates. xxvii, 813; xxviii, 584; xxix, 534; xxx, 672; see also **DELEGATES**.
 — **PHARMACEUTICAL**, Georgia, status. xxv, 518—Kings County, origin. xxv, 511—Pennsylvania, communication, (copyright of pharm. names). xxx, 651—Richmond (Va.), format. suggested, xxi, 107; minutes, (about prescriptions). xxiii, 799.

- Association, WESTERN WHOLESALE DRUGGISTS'**, about receiving delegates. xxx, 596.
- Aster DURANDI**;—**A. TAXIFOLIUS**, in Calif. xix, 302.
- **PUNICRUS**, Kansas. xxix, 442.
- **RED-STALKED** = **A. puniceus**. xxix, 442.
- **TRADESCANTI**, Kansas. xxix, 442.
- Astracantha LONGIFOLIA**, descript. and uses in India, Dymock. xxv, 126.
- Asthma**, cigars of eucalyptus leaves. xix, 276.
- Astragalus CARYOCARPUS**, Kansas. xxix, 447.
- **CROTALARIA**, Calif. xxvii, 247.
- **ERIOPHAGA**, Morocco. xxiv, 115.
- **MOLISSIMUS**, as loco weed. xxvii, 247.
- **NUTTALLIANUS**, California. xxvii, 611.
- **VERUS**, Asia Minor. xxi, 254.
- **VIRGATUS**, loco weed. xxvii, 247.
- **poisonous species**, Maisch. xxvii, 247.
- Atauhero** = **Rhabdothamnus Solandri**, New Zealand. xxiv, 737.
- Atees (Atis)** = **Aconitum heterophyllum**, India. xxiv, 724; xxvii, 198. See also **ACON. HETERO-PHYLL.**
- Atesin**, see **ATISIN**.
- Athanasia AMARA**, Mexico. xxiv, 774.
- Atherosperma MOSCHATA**, Australia, yield of oil, Bosisto. xxi, 262.
- **NOVA-ZEALANDICA**. xxiv, 737.
- Atherospermia**, Zeyer. xxi, 262.
- Atisin (Atesin)**, fr. **Aconitum heterophyllum**, Broughton. xxiii, 425; xxvii, 198, 9; Wasowicz. xxvii, 199; Wright. xxviii, 337—salts (6), Wasowicz. xxvii, 199.
- At Kulagi**—a spec. of rhubarb, Turkestan. xxii, 104.
- Atlanchana**, Mexico. xxiv, 776.
- Atlanta**, its healthiness. xxv, 507, 515, 516.
- Attractylis GUMMIFERA**, examin., Lefranc. xix, 285—chewing gum, Greece. xxiii, 167; xxiv, 141.
- **LANCEA**, China. xxviii, 148.
- **OVATA**, Japan, descript., Holmes. xxviii, 148.
- Attractylodes ALBA**, China. xxiv, 750, 759.
- **RUBRA**, China. xxiv, 749.
- Atriplex CALIFORNICA**, as soap. xxvii, 153.
- **CANESCENS**;—**A. CONFERTIFOLIA**;—**A. EXPANSA**;—**A. LENTIFORMIS**;—**A. NUTTALLII**;—**A. POWELLII**, California. xxvii, 153.
- Atropa MANDRAGORA**, Turkestan. xxi, 215.
- Atropin "a"** = atropin of Ladenburg. xxx, 442.
- **"j"** = hyoscamin of Ladenburg; Merck. xxx, 422.
- **"HEAVY"** = atropinum verum (fr. belladonna), Merck. xxx, 422—Ladenburg. xxviii, 336.
- **"LIGHT"** = hyoscyamin (fr. belladonna), Merck. xxx, 422—Ladenburg. xxviii, 336.
- Atropin**, antidote (pilocarpia), Kouders. xxx, 423—act. of arsen. sod., Tattersall. xxviii, 324, 5; of ferric chloride; butter antim.; stannous chlor., Godeffroy. xxvi, 559; of sulpho-molybdate ammon., Buckingham. xxi, 369; of sulph. ac., bichr. pot., chlor. lime, Hamlin, Jr. xxix, 324—commercial, is a variable mixture, Regnault; Valmont. xxx, 422—its mydriatic prop. to be used in apparent death, Deboux. xix, 229—not identical with daturia, Poehl. xxvi, 591; xxvii, 508—electrolysis, Bourgoin. xix, 223—estimation (bism. and pot. iod.), Thresh. xxviii, 320—in "eye drops," cause of pain, Willmott. xxiii, 422—identical with heavy atropin; heavy daturin; atropinum verum; daturinum verum; Merck. xxx, 422—micro-sublimating point, Blyth. xxvii, 483—morphia is not an antidote, Knapstein. xxvii, 508; and morphia, respective balancing quantities in combination, Didama. xxvii, 93—preparation: Gerrard (alc., am., ether). xxx, 422; Boiraux and Léger (by benzol fr. aq. extr. bell.). xxiii, 421; Pesci (benzin). xxix, 337—stable solut., Tichborne. xxviii, 59; soluble in alc., Lafean. xxix, 324; in chloralhydrat, Fairthorne. xxiii, 345; in glycerin, Farrey. xxviii, 285; in oil by glac. acet. ac., Barnes. xxiv, 343—synthesis (fr. tropia, tropic ac.), Ladenburg. xxviii, 333—tests: fuming nitr. ac., potassa, Vitali. xxix, 336; xxx, 423; Ph. Germ. test incorrect, Calmberg (sulph., nitr. ac.). xxiii, 422; chlor. gold; tinct. iod., Calmberg. xxiii, 422.
- Atropin, BENZOATE**, not stable in solut., Tichborne. xxv, 308.
- **BORATE**, not stable in solut., Tichborne. xxv, 308.
- **OLEATE**, Gerrard. xxi, 348.
- **PLATINO-CHLORIDE**, Schmidt. xxix, 335.
- **SALICYLATE**, Tichborne. xxv, 307; Vulpius. xxvii, 467.
- **SULPHATE**, act. of sugar and sulph. ac., Hamlin, Jr. xxix, 325—hypodermic solut., Powers. xxvii, 92—ophthalm. value compared to duboisina, Risley. xxviii, 335.
- Atropidin**=daturin and duboisin, Merck. xxx, 422.
- Atropis CALIFORNICA**. xxvii, 604.
- Atrophyl (?) tropein** (=anhydro-atropin), Ladenburg. xxx, 424.
- Atroxyl (?) tropeine**, Ladenburg. xxix, 337.
- Attalus III.** xxv, 475.
- Attar (otto)**, see **OIL**.
- Aubletia TRIFOLIA**, Brazil. xxiv, 162.
- Audibertia GRANDIFLORA**, Calif. xix, 304—**A. POLYSTACHYA**, Calif. xxvii, 163—**A. STACHYOIDES**, Calif. xix, 304.
- Auklandia COSTUS**, China. xxi, 209; xxiv, 758; India. xxi, 224; xxvi, 224.
- Aurantiaceae**. xxiii, 195; xxiv, 170; xxv, 185; xxvi, 257; xxvii, 210; xxviii, 169; xxix, 195.
- in Sicily, disease. xxiii, 195.
- Aurantiin**, Stabler. xxii, 394; bitter taste destroyed by acet. ac., Stabler. xxiii, 195.
- Aurantine**, oil fr. **Pinus sabiniana**, Calif. xxvii, 628.
- Aurantium**, see **ORANGE**.
- Australene**, fr. **Pinus australis**. xxvii, 384.
- Australia**, cultivat. of medicinal plants. xxi, 201—pharmacy. xix, 315.
- Austria**, Centennial Exhibit: chemicals. xxiv, 795—drugs. xxiv, 743.
- **Drugs**. xxii, 166—pharmacy. xix, 316.
- Auvier**—**Pinus cembra**, France. xxvi, 322.
- Ava**, see **KAVA-KAVA**.
- Avalkati**—**Phyllanthus emblica**, India. xxviii, 194.
- Avarum bark**—**Cassia auriculata**. xxiv, 716.
- Avena FATUA**, California. xxvii, 604.
- Avignon BERRIES**, see **FRENCH BERRIES**.
- Avoira**—**Elis guinéensis**. xix, 296.
- Awk**—**Helianthus petiolaris**; **H. lenticularis**, California. xxvii, 178.
- Awla**—**Phyllanthus emblica**, India. xxviii, 194.
- Awul**—**Cassia auriculata**, India. xxv, 211.
- Ayapana**—**Eupatorium ayapana**, India. xxv, 156.
- Ayer**, Ague mixture, analysis, Churchill. xxiv, 417—hair vigor, Chandler. xviii, 215.
- Ayers, J. M.**, cleanliness as a pharm. virtue. xxii, 348.
- Azadirachta INDICA**, bitter principle, Broughton. xxii, 155—uses in India. xxiv, 724—examin. of gum, Masing. xxix, 213.
- Azafran DE CASTILLA**, Arg. Republ. xxiv, 763.
- Azhinji**—**MARAN**—rootbark of **Alangium Lamarckii**, India. xxvii, 237.
- Azophenylen**, fr. azobenzoate calc., Claus. xxii, 211.
- Azulene**, in oil of **Asarum canadense**, Power. xxviii, 483.
- Azulmin** fr. hydrocy. ac. xxviii, 232.
- Babbe**—**Calophyllum spurium**, India. xxv, 185.
- Babcock, J. F.** Iodide of arsenic. xxiii, 693, 829—paraffin and its uses. xxiii, 797.
- discussion: xxiii, 757, 797, 821, 829, 832, 833, 837, 838, 839, 840—xxiv, 612, 613, 616, 617, 623, 655, 656, 661.
- Babool (Babul)**—**Acacia arabica**, India. xxiv, 716; xxv, 212.
- Baccarina** fr. **Baccharis cordifolia**, Arata. xxviii, 148.
- Baccharis CHILFA**;—**B. CHILQUILLA**, Chili. xxiv, 760.
- **CORDIFOLIA**, Brazil, alkaloid (baccarina) Arata. xxviii, 148.
- **PATAGONICA**, Chili. xxiv, 765.
- **PILULARIS**, Calif. xxvi, 698; xxvii, 610.
- **UMBELLIFORMIS**, Chili. xxiv, 765.
- **VENETA**, Mexico. xxiv, 187.
- Bach (BACHA)**—a spec. of calamus, India. xxix, 118.

- Bacilla CUNEIFORMIA CARBOLICA**;—**B. C. NASALIA**;—**B. C. TANNICA**;—**B. C. ZINCICA**, Hager. xxviii, 71.
— See also **BOUGIES**; **PENCILS**.
- Bacteria**, review of investigat., Marpmann. xxx, 144.
- Badaward**—a spec. of *Emex*, Persia. xxviii, 118.
— *Tricholepis procumbens*, India. xxviii, 149.
- Badbo-ki-zirangi**—*Mylabris cichorei*, India. xx, 249.
- Badge, ASSOCIATION**, suggested, Markoe. xxi, 10—xxiv, 583; xxv, 19.
— **OFFICERS**, xxiv, 583.
- Badger, Chas. W.** xxi, 86—portrait. xxix.
- Badiane** see **STAR ANISE**.
- Bael**—*Aegle marmelos*, India. xxiv, 725.
- Bærenklau**—*Euryangium sumbul*, Eastern Russia. xxv, 171.
- Bags**, manuf., Calif. xxvii, 622.
- Bahera**—fruit of *Terminalia bellerica*, India. xxvii, 233.
- Bahia ARACHNOIDEA**, Calif. xix, 303; xxvi, 698; xxvii, 608.
— **ARTEMISIAEFOLIA**;—**B. CONFERTIFLORA**, Calif. xix, 303.
— **POWDER**, see **ARAROA**. xxiii, 213.
- Bahubara** = fruit of *Cordia myxa*; *C. latifolia*, India. xxviii, 129.
- Bai** = *Amygdala nana*, Japan. xxviii, 179.
- Baibula**—*Plantago major*, Malia. xxvi, 167.
- Bai-kai-so**—*Veratrum album*, Japan. xxviii, 107.
- Bai-mo**—*Fritillaria Thunbergia*, Japan. xxviii, 110.
- Bakayan**—*Melia azadirachta*, India. xxvi, 165.
- Baker, T. Roberts**, chloral-hydrate as antiseptic. xxiii, 710—report, drug market, Richmond, Va. xxvi, 646.
— discussion: xxii, 543, 567; xxiii, 784, 825; xxv, 507; xxvii, 772; xxviii, 533, 534, 537, 563; xxix, 507, 508; xxx, 595, 664, 666.
- Bakes, W. C.** Letter about a pharmaceut. store in Centennial building. xxii, 567—precautions in dispensing poisons. xix, 436.
- Baking powder**, HOKSPORD'S, manuf., Ott. xxiii, 277.
— acid phosphate, Davis. xxviii, 92.
- Baladur**—*Semecarpus anacardium*, Turkestan. xxi, 258.
- Balance**, Becker and Son. xxiii, 841—Bunge (short-armed) xxix, 28—Cross, (spiral) xxx, 27—Gilbert, (for filters, in metal cone) xxx, 27—Gorham, (graduated sliding tube) xxx, 26—Mendeljeff (short arms, 4 in. long) xxiv, 27, 50—Mohr-Westphal (sp. gr.) xxv, 34—Parrish, (sp. gr., no calcul., nor exact weight). xxvi, 45—Ruprecht (glass cylinder scales). xxix, 29—Westphal (movable feet and scale bearer). xxix, 27.
- Balances**, Redwood. xxix, 30.
- Balasan**—Balsam of *Balsamodendron opobalsamum*, India. xxvi, 165.
- Balata** fr. *Sapota Müllerii*, Brazil. xviii, 272; xxvi, 220—(bully tree gum), Honduras. xxx, 186.
- Balchar**—*Nardostachys jatamansi*, India. xxvii, 180.
- "Balking"** tobacco. xxvii, 158.
- Ballija**—*Terminalia Bellisea*, Turkestan. xxi, 245.
- Balluff, Paul**. Powdered blue mass. xxii, 526—pharmaceutical legislation in U. S. xx, 161—assistant pharmacists, xxii, 353.
— discussion: xx, 54, 56, 63, 77, 82; xxi, 30, 33, 67, 95; xxii, 494, 526, 529, 532, 541, 542, 543, 544, 563.
- Balm of COLUMBIA**—oil of *Dipteryx eboensis*, Central America. xxvi, 293.
— of **GILEAD, AMERICAN**—gum-resin fr. *Icica altissima*. xxiv, 195.
— **MOLDAVIAN**—*Dracocephalus moldavicus*. xxvii, 384.
- Balsa PALMA**, South America. xxvii, 816, note.
- Balsams**, sp. gr., (floating in liquids of known sp. gr.) Hager. xxvii, 422—distinguishing tests, Hirschsohn. xxvi, 449, 459.
— **ANTISEPTIC** and cicatrizing, Felix. xxvii, 122.
— **BRAZILIAN**, fr. *Myroxylon peruiferum*, Peckolt. xxix, 217.
— **CANADA**, (Bals. fir) collect., Brunet. xxv, 337; Morel. xxvi, 314—analysis, Bonastre, Wirzen, Flückiger. xxvi, 316—behavior to reagents,
- Balsams (Continued).**
Hirschsohn. xxvi, 453-9—history, Flückiger. xxx, 252—Drug market. xix, 401; xx, 119; xxi, 433.
— **CAROBA**, Peckolt. xxx, 177.
— **CARPATIC**, fr. *Pinus cembra*. xxvi, 322.
— **COPAIVA**, adult. (oil sassaf., turp., Ven. turp.), Hager. xix, 273; (cast. oil, rosin, oil cop., oil sassaf.) xix, 334; xxi, 477; xxii, 153; xxiv, 404—collect. in Amazon Valley, Cross. xxviii, 26—commercial, examin., Fulton. xxvi, 283; Squibb. xxx, 241—causes of diff. appearances, Bowman. xxvi, 287—detect. of adult. by benzin. xxvi, 287—of castor oil, Muter. xxv, 216; Wayne, (benzin.) xxi, 434; (fallacious, Maisch. xxv, 217); of fixed oils (absol. alc.) Hager. xxiv, 191; (evapor.) Siebold. xxvi, 289; of gurgun bals. (benzin), Hager. xxiv, 191; (gasoline; bisulph. carb.; nitr., sulph. ac.) Siebold. xxvi, 289; of oil turp. (litharge, water) Hager. xix, 273; (distil.) Siebold. xxvi, 289; of rosin (gasolin) Grote. xxix, 221—drops to gramme and c.c., Fulton. xxvi, 288—drug market. xix, 398; xx, 119; xxi, 433; xxii, 622; xxv, 347; xxvi, 654; xxvii, 556, 560; xxviii, 368; xxix, 370; xxx, 464—history, Baillon. xxv, 214-6—in powder (resin cop., calc. magn.), Carlis. xxx, 105—behav. to reagents, Hirschsohn. xxvi, 453-9—tests of purity, review, Siebold. xxvi, 288—yield of a tree, Cross. xxvii, 251.
— **COPAIVA** in capsules, adult. xxiv, 419—pills, (wax, water, magn.), Hager. xxvi, 131.
— **COPAIVA "MISCIBLE,"** (pot. carb.), Groves. xxvii, 251.
— **COPAIVA**, Maracaibo, prop., Bowman. xxvii, 287; analysis, Brix. xxx, 242—Maranham, is a true "balsam," Groves. xxvii, 252—Para is a "bals. and ess. oil," Groves. xxvii, 252; prop. Bowman. xxvi, 287.
— **COPAIVA, RESIN**, see **COPAIVA, RESIN**.
— **DUGTUNGAJAS**, Manila. xxiv, 767.
— **FIR**, see **BALSAM, CANADA**.
— **FIR, OREGON**, adult, Maisch. xxii, 164, 306—drug market. xxi, 433.
— **GREEN, AMERICAN**—oil of *Calophyllum inophyllum*. xxvi, 256.
— **GURJUN**, Hager. xxiv, 172—solubility and reactions, Hirschsohn. xxviii, 185—source, *Dipterocarpus laevis*, Hanbury. xxiii, 216—test (sulph. and nitr. ac.), Flückiger. xxiv, 173—therapeut. value, Gilmour. xxiii, 216—residue examin., Flückiger. xxvi, 268.
— **HUNGARIAN**, fr. *Pinus pumilio*. xxvi, 322.
— **MARIA**, Manila. xxiv, 767.
— **MECCA**, behav. to reagents, Hirschsohn. xxvi, 453-9—fr. *Balsamodendron opobalsamum*, India. xxvi, 165.
— **OREGON**, see **BALS. FIR, OREGON**.
— **PERU**, adult. (castor oil, alc., turp.). xxi, 477; (storax). xxii, 307—behav. to reagents, Hirschsohn. xxvi, 453-9—estimat. of cinnamic ac., Senior. xxx, 243—collection in Guatemala, Wyss. xxvi, 284—constituents, Delafontaine. xviii, 283; Kraut. xviii, 282—detect. of alc. (bichrom. pot., sulph. ac.), Gawelowski. xxiv, 189; of castor oil (sulph. ac.), Racher. xxiv, 189; of copaiva (sulph. ac.), Schawhl. xix, 272—drug market. xx, 119; xxi, 434; xxii, 622; xxvii, 557, 560; xxviii, 369; xxix, 370; xxx, 464—test for purity (sp. gr., lime, bisulph. carb.), Flückiger. xxix, 215; (petrol. ether), Dörscher. xxx, 243; (sp. gr., benzin, soda), Hager. xxviii, 185; (sp. gr., appear. of drops), Senior. xxx, 243; (petrol. eth.). xxi, 255—resin, is pyro-catechuic ac., Kähler. xviii, 284—substit. (bals. salicyl.-benzoin.), Hager. xxviii, 90.
— **PERU**, compar. to Bals. fr. *Myroxylon peruiferum*, Peckolt. xxix, 216.
— **PLANT** = *Gnaphallum macrocephalum*, Calif. xxvi, 698.
— **SULPHUR**, history (fr. Basil. Valentin.), Mathias. xxviii, 44.
— **TAGULAOAY** (a solut. in cocoanut oil of resins, fr. root of several vines) Manila, Gruppe. xxv, 374.
— **TOLU**, adult, (unknown bals.), Naylor. xxvi,

Balsams (Continued).

286; (rosin), Bückle. xxiii, 498; (only 26 p. c. true bals.), Mattison. xxiv, 404—behav. to reagents, Hirschsohn. xxvi, 453—constituents (cinnam., benz. ac.), Busse. xxv, 207; (only cinnam. ac.), Carles. xxii, 149—drug market. xx, 119; xxi, 434; xxii, 622; xxiv, 395; xxv, 347; xxvi, 654; xxvii, 557, 560; xxviii, 369; xxx, 465—cannot be emulsified, Bedford. xxi, 76; emulsion=(sugar-milk, alc., acac.), Greenish. xxv, 91; (tinct. quillaya), Phar., Soc., Paris. xxv, 92—sp. gr., Hager. xxvii, 424.

— see also BALSAMUM.

— WHITE = *Gnaphalium macrocephalum*, Calif. xxvii, 611, and *Gnaph. polycephalum*. Kansas. xxix, 442.

Balsamito = resin fr. seeds of Bals. peru tree. xxvi, 285.

Balsamo = *Myrospermum Pereira*, Mexico. xxiv, 776.

— BRUTO = crude bals. Peru. xxvi, 285.

— DE CASCARA = bals. Peru fr. boiling the bark with water. xxvi, 285.

— CATOLICO = resin fr. seeds of bals. Peru tree. xxvi, 285.

— DE TRAPO = bals. Peru fr. the rags. xxvi, 285.

Balsamodendron BERRYI, India. xxiv, 125; xxvii, 261.

— EHRENBURGIANUM. xxvii, 260.

— MUKUL, India. xxiv, 195; xxv, 219; xxvii, 261.

— MYRRHA. xxvii, 260.

— OPOBALSAMUM, descript. and uses of berries, bals. and wood in India, Dymock. xxvi, 160, 165—xxvii, 260.

— PUBESCENS, India. xxiv, 195.

— ROXBURGHII, descript. and uses in India, Dymock. xxiv, 195; xxv, 219.

Balsamorhiza MACROPHYLLA, Calif. xix, 303.

Balsamum ANTARTHRITICUM INDICUM, examin., Hirsch. xxvii, 252—source (*Eperva falcata*) Martius. xxviii, 186.

— SALICYLICO-BENZOINATUM (= veterinary subst. for bals. Peru), Hager. xxviii, 90.

— STORACIS MEXICANUM, descript., Müller. xxiii, 160.

— VITAE CITRINUM, Dutch Phar. Soc. xxx, 107.

— see also BALSAM.

Baltimore, Pharmacy Law. xviii, 314; xx, 148, 153; xxiv, 429, 431.

Bamatu, of "Pomet" (history of drugs.), xxvi, 845.

Bamboo, when flowering produces fever, Peyton. xxvi, 182.

Ban-ada = *Zingiber Cassumunar*, India. xxviii, 114.

Banana, brandy, Venezuela. xxvii, 145—keeps the soil moist; as shade plant in coffee plantat., Venezuela. xxvii, 145—flour (66 starch, 3 prot.), xxvii, 145—sugar (20 p. c.), Corenwinder. xxvii, 145.

Banapu = *Terminalia tomentosa*, India. xxiv, 718.

Bandage-GAUZE, Lister, prep. (as old style wax paper), Müller. xxii, 53—improved method (with castor oil for paraffin), Bruns. xxvii, 120—original formula, Lister (with paraffin). xxvii, 120.

Baneberry, BLACK = *Actaea nigra*. xxi, 620.

— RED = *Actaea rubra*, Calif. xix, 298; xxvii, 607.

Banquets, discussion (Remington, Seabury), xxx, 650, 661.

Baobab, see *ADANSONIA DIGITATA*.

Baphullec = *Pastinaca grande*, India. xxvii, 194.

Baptisia AUSTRALIS, Kansas. xxix, 447.

— TINCTORIA, adult. of powd. xxx, 576—alkaloid, Green. xxviii, 187; alkaloid (of Smedley) is calc. sulph., Warner. xxviii, 187—descript., U. S. Ph. revision, xxvii, 672—in typhoid, Johnson. xxviii, 187.

Baptisin (eclect.), solubility, Parker. xxx, 128.

Baragach = *Croton oblongifolia*, India. xxviii, 193.

Barakavar = *Crinum asiaticum*, India. xxix, 127.

Bara-mai = galls of *Tamarix gallica*, India. xxvi, 281.

Barba DE PIEDRA, Arg. Republ. xxiv, 762.

— TIGRIS, Arg. Republ. xxx, 138.

Barbaloin, Tilden. xxi, 390; xxiv, 378—act. of bichrom. mixt., Tilden. xxvi, 614—constit.,

Barbaloin (Continued).

Schmidt. xxiv, 379—distinct. test fr. nataloin (sulph., nitr. ac.), Histed. xxiv, 379—prep., Mitchell; Schmidt. xxiv, 379—therapeut. value, Dobson. xxvi, 616.

Barbarea VULGARIS, Calif. xix, 299.

Barberry, HOLLY-LEAVED, see *BERBERIS AQUIFOLIUM*.

Bari-kasondi = *Cassia occidentalis*, India. xxvi, 166.

Barium. xviii, 232; xix, 203; xxi, 294; xxii, 193; xxiii, 275; xxvi, 383; xxviii, 237; xxx, 290.

— Metallic (iodide and sodium), Kern. xxiii, 276.

— ALLYLATE, Vincent and Delachanal. xxix, 299.

— AMIDO SULPHONATE, Berglund. xxvii, 331.

— BICHROMATE, Preis and Rayman. xxix, 267.

— BROMIDE, Goebel. (carb., brom. am.) xxix, 250; McDonald (carb., hydrobr. ac.) xxi, 294.

— CARBONATE, decomp. with charcoal at red heat, Jeambert. xxvi, 383—fr. witherite (by judic. use of oxal. ac.), Creuse. xix, 203—prep. (chlor., carb. am.) McDonald. xxi, 294.

— CARYOPHYLLINATE, Mylius. xxii, 219.

— CHLORATE (chlor. lime, chlor. bar.) Pechiney. xxx, 272.

— CHLORIDE, fluid volume, Candidus. xxvii, 709; xxviii, 420—in Kanawha salt, Scheffer. xxiii, 272—test for hyposulphite (corros. subl.) Wittstein. xix, 203.

— CHROMATE, cryst., Bourgeois. xxvii, 353.

— DICHLOROPROPIONATE, Backunts and Otto. xxvi, 533.

— GAMBOGIATE, Costelo. xxvii, 210.

— GLYCYRRHIZATE, Seelini. xxviii, 345.

— IODIDE, cryst., constitution, Thomsen. xxvi, 383—prep., Kern. xxiii, 276.

— and IRON MECONATE, Rennie. xxix, 315.

— ISOVALERIANATE, Schmidt. xxvii, 457.

— MANGANATE, as subst. for Schweinfurt green, Böttger. xxiii, 288.

— MORPHINATE, Chastaing. xxx, 401.

— MYRISTICATE, Flückiger. xxiii, 311.

— PEROXIDE, adult. (tartar emet.) xxiii, 518—prep., Thomsen. xxii, 193.

— SILICATE, cryst., Chatelier. xxx, 291.

— SULPHATE, native, in California. xxvii, 586—for painting, preparation, Sloane. xxx, 291—solubility in sulph. ac., Struve. xviii, 224.

— SULPHIDE, manufact. xix, 203.

— SULPHOCARBONATE, Thénard. xxiii, 277.

— SULPHO-CHROMITE, Graeger. xxx, 297.

— SULPHO-METHYLATE, Rabuteau. xxvii, 411.

— See also BARYTA.

Barks, when to gather, Diehl. xviii, 140.

Bark, CALISAYA, see *CINCHONA*.

— *CINCHONA*, see *CINCHONA*.

Barleria PRIONITIS, descript. and uses in India, Dymock. xxviii, 124.

Barley (ungerminated) glycerin extract, Poster. xix, 234—contains zinc, Bellammy and Lechartier. xxvi, 400.

Barosma BETULINA, ash and soluble matter, Jones. xxvii, 207—oil, Flückiger. xxii, 132.

— CRENULATA, ash and soluble matter, Jones. xxvii, 207.

— ERICIFOLIA, descript. and uses, Holmes. xxvi, 251.

— SERRATIFOLIA, ash and soluble matter, Jones. xxvii, 207.

Barras—turpentine (impure galipot), France. xvi, 319—Burgundy pitch, France. xxvi, 323.

Barre—seeds of *Carthamus tinctorius*, India. xxvi, 722.

Barrels, manuf. in Calif. xxvii, 622—mouldy, to clean (soda, mur. ac.). xxviii, 98.

Barringtonia ACUTANGULA, descript. and uses in India, Dymock. xxv, 204.

Bar-rooms, pharmaceutical, at annual exhibit. xix, 387.

Bartundia—*Morinda citrifolia*, India. xxv, 163.

Bartung—*Plantago psyllium*, India. xxvi, 159.

Baryta, crystals (heat nitrate), Brügelmann. xxvii, 332—in Egyptian wheat, Dworzak. xxiii, 126—prep. (sulph. bar., oxide iron), Maumené. xxx, 290; (by continuous process), Nickles. xviii, 232; (sulphide bar., oxide zinc), Rosenstiehl. xix, 203.

Baryta, see also **BARIIUM**.

Barytin, of Simon (alkaloid in *Veratr. alb.*)=*Jervia*. xxvi, 592.

Basalt, solubility in water, Cossa. xix, 196.

Bases, ORGANIC, see the respect. **ALKALOIDS**.

Basfaii=*Polypodium vulgare*, India. xxvi, 159.

Basr-i-chammos=a spec. of rhubarb, Turkestan. xxii, 104.

Bassia, species, yield senegal gum, Corre. xxv, 212.

— **BUTYRACEA**, Africa, descript. of seeds, Möller. xxix, 116—descript. of tree and uses in India, Jackson. xxvi, 219.

— **DJAVE**, Africa, its fat. xxvii, 430.

— **ELLIPTICA**, India. xxiv, 719.

— **LATIFOLIA** (mawha flowers), descript. and uses, India. xxiv, 725; xxvi, 219.

— **LONGIFOLIA**, uses in India, Jackson. xxvi, 219.

— **NOUNJON**, Africa, its fat. xxvii, 430.

— **OLEIFERA**, Africa, descript. of seed, Möller. xxix, 115.

— **PARKII**, Africa (shea butter). xxix, 116.

Bassorin, test (mur. ac., orcein.), Reichl and Breinl. xxx, 367.

Bastin, E. S., atavism in *Cypripedium spectabile*. xxix, 474.

Batatas PANICULATA, descript. and uses in India, Dymock. xxviii, 131.

Batatilla=*Ipomæa brachypoda*, Mexico. xxvii, 157.

Bath, AIR (glass cylinder on heated plate), Fleck. xxx, 53.

— **INDIAN** (water on heated stones). xxi, 619.

Batiator root, Senegal, as subst. for ipecac, Martin. xxvi, 281.

Battley's SEDATIVE, improved, Shuttleworth; Diehl. xxix, 74—Wells. xxiii, 73.

Bauhinia gum, Queensland. xxiv, 741.

— **VARIEGATA**, uses in India, Dymock. xxvi, 166.

Baume DU CANADA. xxvi, 314.

— **DE GILÉAD, FAUX**=Bals. fir. xxvi, 314.

— **MARIE**=oil of *Calophyllum inophyllum*. xxvi, 256.

Baumé (not: *Beaumé*), sp. gr., formula and hydrometer, Pile. xviii, 155; xix, 139.

Baumier DE GILÉAD=*Alies balsamea*. xxvi, 315.

Bawachs=*Psoralea corylifolia*, India. xxv, 209.

Baxley, J. B. xviii, 65.

Bayley, Fr. xxii, 502.

Bayberries (1610) fr. *Myrica cerifera*. xix, 491.

Bayberry bark, adult. of powd. xxx, 576.

Baycuru=*Statice Brasiliensis*, account, descript., Symes. xxvii, 153, 5, 6.

Baylahuen=*Haplopappus baylahuen*, Chili. xxiv, 765.

Bay rum, manuf., St. Thomas. xxx, 109—drug market. xxi, 436—cheap, Hogan. xxv, 99; Rother. xxiv, 97—stamping. xix, 101. See also **OIL BAY**.

Bdellium of the Ancients=gum of *Balsomodendron Mukul*, Bennet. xxiv, 195.

— **INDIAN**. xxv, 219.

Beads, PRAYER=seeds of *Abrus precatorius*, India. xxiv, 192.

Beans contain zinc, Bellammy and Lechartier. xxvi, 400.

Beard's tongue=*Pentstemon pubescens*, Kansas. xxix, 451.

Bear's foot=*Polymnia uvedalia*, xxvii, 178; Kansas, xxix, 442.

Bebeeria, estimat. (bism. and pot. iod.), Thresh. xxviii, 320—the only valuable substitute for quinia, Husemann. xxvi, 581—febrifuge prop. denied, Hebenstreit. xxvi, 581—identical with buxin and pelosin, Flückiger. xviii, 288.

— **MURIATE**, cryst., Dott. xxvii, 515.

— **SULPHATE**, commercial is only a purif. extract, Dott. xxx, 435—constitution, Dott. xxx, 435—cause of precip. in dil. solut., Nesbit. xxix, 345—solubility in alcohol, Candidus. xxx, 565—test (ferric chlor., sulph. ac.), How. xxvi, 561.

Bechi Badean=*Althaea officinalis*, Turkestan. xxi, 234.

Becker, Chas. Apprenticeship. xxiv, 452.

— Discussion: xxiii, 786, 787; xxviii, 531, 533, 535, 557, 560, 565, 566, 567, 569.

Bedford, P. W. Decrease of sp. gr. of mineral acids. xxiii, 661—mineral acids, C. P. of com-

Bedford, P. W. (Continued).

merce. xxi, 429—address, inaugural. xxix, 492; annual. xxx, 583—Am. Phar. Association, review of work done. xxx, 583—emulsifying bals. tolu. xxi, 76—commercial bismuth and its salts. xxx, 563—creasote of commerce. xxx, 575—ether of commerce. xxiii, 722—wholesale and retail druggists. xxx, 627—report on drug market. xxi, 420; xxii, 615—iron subcarbonate. xix, 528—liquor dealers' license. xxii, 548—magnesia carbon. of commerce. xxii, 567—olive oil, adult. xix, 95—pharmaceutical education. xxx, 590—revision of the pharmacopœia. xxiv, 643, 7—sulphate of potassium of commerce. xxii, 499—sodium bicarb. of commerce. xxiii, 689—sodium phosphate of commerce. xxix, 433—syr. senega. xx, 64—white wax and adulterations. xxv, 444, 543.

— Discussions: xviii, 67; xix, 95, 109, 125, 126; xx, 64, 73, 81, 110; xxi, 38, 76; xxii, 496, 499, 510, 514, 544, 548; xxiii, 753, 754, 757, 784, 795, 796, 822, 823, 830, 836, 837, 841, 843; xxiv, 638, 617, 622, 643, 647, 648, 649, 658, 662, 670, 687; xxv, 481, 512, 516, 527, 539, 543, 544, 552, 566; xxvii, 805, 806; xxviii, 510, 511, 560, 572; xxix, 511, 519, 520; xxx, 595, 596, 597, 602, 618, 627, 647, 661, 666.

Bedmushk (Persian)=flowers of *Salix caprea*, India. xxviii, 193.

Beech leaves, p. c. of ashes. xxii, 137, Wanklyn; ashes cont. manganese. xxii, 162. See also **FAGUS**.

Beef tea, cold, Dutch Phar. Soc. xxx, 70—not over 140° F., Hare. xxvi, 151—scrape, no straining, Wood. xxi, 173.

Beer, analysis, Ender. xxviii, 275; Dragendorff. xxiii, 520; xxx, 338; Wittstein. xxiii, 340, 520; Hoffstedt. xxii, 226—cont. often a bitter principle by neglect. ferment., Langbeck. xxvii, 405—clarified (tannin and isinglass), Brescius. xxii, 227—detect. of bitter substances, Dragendorff. xxx, 338; Hoffstadt. xxii, 226; Wittstein. xxiii, 340; of caramel (tannin), Schuster. xxii, 227; of picric ac. (woolen thread), Brunner. xxiv, 418—extract and alcohol determin. hallymetrally, Fuchs; Wittstein. xxvii, 400; estimat. of glycerin, Clausnizer. xxix, 302; of sulphate calcium, Wilson. xxvii, 405.

— **ANTISCORBUTIC**, Sydenham, Dutch Pharm. Soc. xxx, 109.

— **FLOWER**=*Hydrophyllum virginicum*, Kansas. xxix, 445.

Bees in India. xxiv, 724—collect. of products, Creighton. xxiv, 206.

Beeswax, see **WAX, YELLOW**.

Beet LEAVES, cont. oxal. ac. (4 p. c.), Müller. xxix, 136.

— **ROOT**, products of alcohol. fermentat., Pierre and Truchot. xix, 241—contains arabin and not metapeptic ac., Scheibler. xxii, 245; cont. glucose, Krause. xxiii, 147; cont. zinc, Bellammy and Lechartier. xxvi, 400—quality is in inverse ratio to the bulk of crop, Duvin. xxiv, 316—yield of sugar according to manure, Ladureau. xxvi, 202—analysis of ashes. xxvi, 512.

Beet (root) SUGAR. See **SUGAR, BEET**.

Beggars' Ticks=*Cynoglossum Morrisonii*, Kansas. xxix, 440; = *Bidens frondosa*, Kansas, xxix, 442.

Behara—fruit of *Terminalia Bellerica*, India. xxvii, 233.

Bejuco caustico, Arg. Republ. xxiv, 762.

Bela=*Aegle marmelos*. xxvi, 257.

Belgium, Centennial exhibit: chemicals. xxiv, 756—pharmacy. xix, 316.

Belladonna, alkaloid, extract. (sulph. ac. water), Günther. xix, 289; (chloroform) Wasilewski. xxv, 136—heavy and light atropia, Ladenburg. xxviii, 336—detect. in beer, Dragendorff. xxx, 339—cultivation, in Canada, Saunders. xviii, 183; xix, 290; at Hitchin, Holmes. xxvi, 205; in Lincolnshire, Holmes. xxx, 165—compar. value of wild and cultivat. plant, Gerrard. xxx, 162—germination of seed, Saunders. xxx, 566—fluorescent body, Richter. xxv, 29, 137—antagonism to opium, Abeille. xviii, 293.

— **LEAVES**, adult. of powd. xxx, 576—loss in drying. xxi, 202.

- Belladonna** ROOT, descript., Holmes. xxx, 164—adult. (*Medicago sativa*), Holmes. xxx, 163; (*Malva sylv.*), Holmes. xxii, 307; of powd. xxx, 576—alkaloids (hyoscyamin; atropin), Schmidt. xxix, 335—relation of starch to atropin, Buddel. xxx, 163.
- **JAPANESE** = *Scopolia japonica*, descript., Holmes. xxviii, 120.
- **SILVESTRE DE CAMPO** = *Cucubalus bacciferus*, Spain. xxi, 215.
- Belladonna**, act. of potassa, Buchheim. xxv, 308.
- Bellis PERENNIS**, constituents, Enz. xviii, 280.
- Bellwort** = *Platycodon grandiflorum*, China. xxiv, 746.
- Benincasa CERIFERA**, India. xxvii, 229.
- Benjamin, D. B.** Fl. extr. ergot for hypodermic use. xxiv, 692—conditions of pharmacy. xxiv, 448—tinct. ferri chlor. xxiv, 675.
- Discussion. xxiv, 675, 692.
- Benta-mare** = *Cassia occidentalis*, Senegal. xxix, 209.
- Benzidol**, fr. wood tar (with chlor. a cinnamon odor), Thenius. xxvi, 432.
- Benzin** (petrol.) and benzol (coal-tar) distinct. by iodine. xxiii, 319; distinct. charact. fr. benzol, Allen. xxviii, 259, 260; Biel. xxix, 283; Dragendorff. xix, 241—deodorized (quicklime), Fairthorne. xxix, 284—correct nomenclature, Heeren. xxv, 269—deserves investig. for making oleo-resins, Maisch. xxi, 138; Remington. xxi, 592; xxii, 536—pharmaceutical uses, Wolff. xxv, 271.
- Benzoic BROMIDE** (of Liebig, Will and Paterna) is benzylidene bromobenzoate, Claisen. xxx, 385—prep., Claisen. xxx, 385.
- Benzoin**, yield of benzoic ac., Grosser. xxx, 188—presence of cinnam. and benzoic ac., Curtis. xxi, 222—cont. free benzoic and cinnam. ac. (by bisulph. carb.), Quichard. xxiii, 162; denied by Rump. xxvi, 534; xxvii, 174—cont. a styrol-like body, Theegarten. xxiii, 162—cont. vanillin, Rump; Jannasch. xxvii, 174—adult. (hemlock bark?) Schulz. xxi, 478—behav. to reagents, Hirschsohn. xxvi, 453—9—drug market. xix, 493; xxi, 437; xxii, 626—soluble in eucalyptus oil, Osborne. xxvii, 234—sp. gr., Hager. xxvii, 424.
- Benzoin, FALSE**—*Terminalia angustifolia*, India. xxiv, 718.
- **ODORIFERUM**, bark analyzed, Jones. xxii, 114—use of berries, Miller. xxvi, 772—vol. oil, Gleim. xxiii, 162.
- Benzol** and benzin, charact. distinct. xxiii, 319; Allen. xxviii, 259, 260; Biel. xxix, 283; Dragendorff. (format. of nitrobenz.). xix, 241—correct nomenclature, Heeren. xxv, 269—act of bromine, Allen. xxx, 314—of ozone, Mailfert. xxx, 259—crude, cont. alcohol (2 p. m.), Witt. xxvi, 472—for extract of alkaloids, Boiraux and Leger. xxiii, 318; 411—yields iodoform, Hager, xxx, 346—from illuminating gas, Caro. xix, 240—opalescent alc. test, Hager. xxx, 319.
- Benzol, METADIAMIDO**, as test for nitrous ac., Griess. xxvi, 341.
- **-CHINON**, Fittig. xxii, 276.
- Benzolin** = benzin. xxviii, 259; —shale naphtha, Allen. xxix, 283, 4.
- Benzoyl-APOCONITIA**, Wright and Lupf. xxvii, 511.
- **-APOSEUDACONITIA**, Wright and Lupf. xxvii, 510.
- **-RESORCIN**, Reverdin. xxvi, 625.
- **-TROPEINE**, Ladenburg. xxix, 337; xxx, 424.
- **-TROPIC**, Buchheim. xxv, 308.
- Benzyliden, BROMO-BENZOATE**, Claisen. xxx, 385.
- Berberidaceae**. xxi, 233; xxvi, 251; xxvii, 201; xxviii, 165; xxix, 191; xxx, 213; of Calif. xix, 298; Kansas. xxix, 440.
- Berberina**, act. of sulpho-molybd. ac., Buckingham. xxi, 361; of thymol, Lloyd. xxx, 435; of chlor. zinc, Jorisson. xxix, 267—discussion. xxvi, 892—distinct. charact. fr. hydrastia and oxyacanth., Parsons. xxx, 434—estimat. (iodo-hydrargyr. pot.), Beach. xxv, 312—found in *Berberis aquifol.*, Parsons. xxx, 213; in *colombo* (by oxal. ac.), Alessandri. xxx, 435; in *Evodia glauca*, Japan, Martin. xxvii, 207—not found in *Fraseria Walteri*, Kennedy. xxi, 637;
- Berberina** (*Continued*).
not in podophyllum, Powers. xxvii, 205—prep. and prop., Lloyd. xxvi, 802; of salts, Lloyd. xxvi, 800—test, (chlor. water, acid.), Klunge. xxiii, 426.
- **CARBAZOTATE**, Lloyd. xxvi, 802.
- **HYDROCYANATE** does not exist, Flückiger. xxi, 370.
- **HYPOPHOSPHITE**, Lloyd. xxvi, 599.
- **iodo-MERCURATE**, Jackson and Payne. xxx, 399, 400.
- **MURIATE**, Lloyd. xxvi, 802.
- **NITRATE**, Lloyd. xxvi, 803.
- **PHOSPHATE**, comp., Parsons. xxvii, 515—prep. and prop., Lloyd. xxvi, 802; Willmarth. xxvii, 514.
- **SULPHATE**, prep. and yield, Lloyd. xxvi, 801, 3.
- Berberis spec.**, review, Maisch. xxvii, 201.
- **AQUIFOLIA**, Calif. xix, 298; xxvi, 698, 707; xxvii, 606—of commerce, mixt. of several spec., Maisch. xxvii, 202—descript., Maisch. xxvii, 202, 5.
- **ASIATICA** (Rusot) India. xxiv, 725.
- **CANADENSIS**, descript., Maisch. xxvii, 201.
- **LYCINUM**, China. xxiv, 746.
- **NERVOSA**, Calif. xxvi, 699.
- **PINNATA**, descript., Maisch. xxvii, 202—in Calif. xxvi, 699.
- **REPENS**, descript., Maisch. xxvii, 202, 3, 4—in Calif. xxvi, 698; xxvii, 605.
- **VULGARIS**, descript., Maisch. xxvii, 201—analysis of fruit, Graeger. xxi, 233—germinat. of seed, Saunders. xxx, 566.
- Bergamot-JUICE**, Italian—prop. and acidity, Warington. xxiv, 329.
- **WILD**—*Monarda fistulosa*. xxix, 446.
- Bergenin**, fr. saxifraga, Garreau and Machelast. xxx, 444—is intermediate betw. salicyl ac. and quinia as nervine- tonic, Garreau and Machelast. xxx, 445.
- Bergera KONINGII**, descript. and uses in India, Dymock. xxv, 185.
- Bernardinite**, fr. California, prop., Stillmann. xxviii, 272.
- Berrian, Jr., G. W.** xxiv, 650.
- Berros**, Arg. Republ. xxiv, 764.
- Berry graine** (1610), fr. *Myrica cerifera*. xix, 491.
- Bertholletia EXCELSA**, analysis of nut, and uses, Corenwinder. xxii, 146.
- **NOBILIS**, Brazil, account. xxiii, 208.
- See BRAZIL NUT.
- Beryllia**, prop., Altenberg. xxiii, 280.
- Beryllium**. xxiii, 280; xxvi, 388—salts, act of trimethylamine, Vincent. xxv, 315.
- **CHLORATE**; — **FERROCYANIDE**; — **HYDRATE**; — **NITRATE**; — **OXALATE**; — **PERCHLORATE**; — **PERIODATE**; — **PHOSPHATE**; — **SULPHATE**, Altenberg. xxiii, 280.
- See also GLUCINIUM.
- Beta VULGARIS**; see BEET.
- Beta**—**COLCHICO-RESIN**, formula, Hertel. xxx, 432.
- Betain**, Scheibler. xviii, 267—is identical with oxyneurin (Liebreich) and lycina, Husemann. xxiii, 427; xxvi, 611—prep., Frühling and Schultz. xxvi, 610.
- Betel nut**, India, account, Jackson. xxiii, 127; xxiv, 725—in Jamaica. xxiv, 735—as vermifuge. xxiii, 128. See also PIPER BETEL.
- Beth root**, adult. of powd. xxx, 576—in uterine hemorrhage. xxi, 619.
- Beth-a-barra**, Africa, analysis of coloring matter, Sadtler and Rowland. xxix, 355.
- Betmese**—inspissated grape juice, Greece. xxiv, 170.
- Betonica OFFICINALIS**, as anti-spree, China. xxiv, 747.
- Betula BHOJPATTRA**, descript. and uses, India, Dymock. xxviii, 198.
- **NIGRA**, Kansas. xxix, 440.
- See also BIRCH.
- Betulaceae**. xix, 293; xxvi, 311; xxix, 234; of California. xix, 306; Kansas. xxix, 440.
- Betulin**, Hausmann. xxv, 321—test (sulph. ac., ferric chlor.), How. xxvi, 561.
- Beu**—*Coriaria ruscifolia*, Chili. xxiv, 765.
- Bever Codd**. (1610) xix, 493.
- Bever Skynnes** (1610). xix, 493.

- Bhairah** = fruit of *Terminalia Bellerica*, India. xxvii, 233.
- Bhamburda** = *Blumea holosericea*, India. xxvii, 180.
- Bhang** (*Cannabis indica*). xxi, 261.
- Bhara** = *Morinda citrifolia*, India. xxiv, 719.
- Bharangi mul** = *Clerodendron serratum*, India. xxv, 142.
- Bhar-jambool** = *Ammania vesicatoria*, India. xxvii, 237.
- Bhat Katya** = *Solanum Jacquinii*, India. xxviii, 120.
- Bhela** = fruit of *Semecarpus anacardium*, India. xxvi, 167.
- Bhilawa** = fruit of *Semecarpus anacardium*, India. xxvi, 167.
- Bhokar** = fruit of *Cordia myxa*; *C. latifolia*, India. xxviii, 129.
- Bhui-amla** (—AULA) = *Phyllanthus niruri*, India. xxviii, 194.
- Bhui-kohala** (—KUMRA) = *Batatas paniculata*, India. xxviii, 131.
- Bhui-patr** = *Betula bhojpattra*, India. xxviii, 198.
- Bhu-ringni** = *Solanum Jacquinii*, India. xxviii, 120.
- Bhurja patra** = *Betula bhojpattra*, India. xxviii, 198.
- Biacuru** = *Statice Brasiliensis*, Brazil. xxvii, 153.
- Biak-mondo** (—MONG-DAU) = *Ophiopogon japonicus*, Japan. xxviii, 204.
- Biak-tau-kah** = *Amygdalus persica*, Japan. xxviii, 179.
- Biak-yitz** = *Atractylus ovata*, Japan. xxviii, 148.
- Biakoo-bookung** = *Roxburghia sessilifolia*, Japan. xxviii, 110.
- Biaku-jutzu** and
- Biakou-sitzou** = *Atractylis ovata*, Japan. xxviii, 148.
- Bibai-kand** = *Batatas paniculata*, India. xxviii, 131.
- Bibliography**. xviii, 295; xix, 321; xxi, 409; xxii, 293; xxiii, 475; xxiv, 561.
- Bibromacetyl-QUERCETIN**. xxviii, 344.
- Bibrom-AMYLEN**. xxvii, 415.
- Bibrom-QUERCETIN**. xxviii, 344.
- Bicarbonates**, estimat. of carbon. ac. (phosph. copp.), Lory. xviii, 225.
- Bichlor-ALLYLEN**, fr. croton-chloral, Mason. xxii, 234.
- Bichromate mixture** = bichrom. pot. and sulph. ac.
- Bidara Laut** = *Zizyphus spec.*; or *Strychnos ligustrina*; or *Eurycoma longifolia*, descript. and examinat., Greenish. xxvii, 169.
- Bidchisht** = willow manna, Persia, xix, 284.
- Biddle, C. J.** *Epilobium angustifolium*, xxv, 434.
- Bidens BIPINNATA**; — *B. CONNATA*, Kansas. xxix, 442.
- Bidwell, M. S.** Alcohol and mucilage acacia. xxiii, 612—liq. ferri chlorid. dilut. xxiv, 481.
- Discussion. xxiii, 787, 793, 805, 830, 836.
- Bier** = *Zizyphus jujuba*, India. xxviii, 195.
- Bigelovia MENZIESII**, Calif., as *damiana*. xxiv, 187.
- *VENETA*, Mexico, as *damiana*. xxiv, 187, 679.
- Bignonia ANTISYPHILITICA**, Brazil. xxx, 177.
- *DEPAUPERATA*, Brazil. xxvii, 166.
- (— *Sparattosperma*) *LEUCANTHA*, Brazil, account and chem. exam., Peckoldt. xxvii, 167.
- *NODOSA*; — *B. OBOVATA*; — *B. PURGANS*; — *B. QUINQUEFOLIA*, Brazil. xxx, 177.
- *XYLOCARPA*, uses in India, Dymock. xxvi, 159.
- Bignoniaceæ**. xxii, 115; xxiii, 156; xxv, 146; xxvii, 166; xxviii, 131; xxx, 176; of Mexico. xxiv, 773.
- Bignoniin** (= *Sparattospermin*), Peckoldt. xxvii, 167.
- Bikma** = root of *Aconit. palmat.*, India. xxvi, 158.
- Bila** = fruit of *Semecarpus anacardium*, India. xxvi, 167.
- Bilberries**, see *VACCINIUM VITIS IDÆI*.
- Bile**, blue, examin., Andouard. xxvi, 643—blue coloring matter, Ritter. xix, 234—human, examin., Jacobson. xxii, 291—in urine, tests: chlorof., Cunisset. xix, 234; modif. of Hoppe-Seiler, Hilger. xxiii, 474; filtering paper, nitr. ac., Rosenbach. xxiv, 92; tinct. iod.; peroxide hydrog., ferric chlor., Smith. xxvi, 644.
- Bilirubin**, relation to chlorophyll, Gautier. xxviii, 352.
- Billings, Clapp & Co.**, letter about cinchoquinine. xxii, 645.
- Bindweed** = *Convolvulus arvensis*, Kansas. xxix, 443.
- Birch**, RED = *Betula nigra*, Kansas. xxix, 440; — *Fagus Menziesii*, New Zealand. xxiv, 738.
- see also *BETULA*.
- SAP, analysis, Henner. xxvi, 311.
- TAR, see TAR, BIRCH.
- Bird-lime** fr. *Oleander*, Bermuda, account. xxiv, 740.
- Birds' nests**, edible, account, India. xxiv, 723.
- Birhatta** = *Solanum indicum*, India. xxviii, 120.
- Bireez** = gum-resin of *Ferula galbaniflua*, Persia. xxvii, 193.
- Bish** = *Aconit. ferox*, India. xxiv, 724.
- Bishop's weed** = *Anethum Sowa*, India. xxiv, 725.
- Bismuth**. xviii, 240; xix, 218; xxi, 308; xxii, 202; xxiii, 299; xxiv, 255; xxv, 262; xxvi, 408; xxvii, 359; xxix, 269; xxx, 302.
- adult. (antimony) xix, 341—quality of commercial, and of its salts, Bedford. xxx, 563—copper the most difficult contam. to remove, Smith. xxi, 308; estimat. of copper (sulpho cy. pot.), Smith. xxi, 309, 488—drug market. xx, 119; xxi, 428; xxii, 623—estimation (phosph. sod.), Benoit. xxiv, 255; (as iodate), Buisson and Ferray. xxii, 204; xxvi, 410; (is unreliable, Löwig. xxvi, 410)—expands, when solidifying, Boettger. xxiii, 300—found in Australia. xviii, 240; xix, 218; in Bolivia. xxx, 302, 3; in France (70 p. c. metal). xxii, 202; Mexico. xxiii, 299, Texas. xix, 218; xxi, 142; Utah. xxi, 309—precipit. fr. acid moth. liquors by metallic iron, Shorting. xxiii, 300—purified, Thürach. xxv, 262, 3, 5—freed fr. sulphur and arsenic, Méhu. xxii, 203—examinat. of bism. residues, Letts. xxvii, 359—fetid odor after use due to pres. of tellurium, Ekin. xxiv, 256—salts, act. of trimethylamin, Vincent. xxv, 315—tests: iodide lead, Field; Abel. xxvi, 409; iod. copp., sulphur, Hutchings; Kobell. xxvi, 408; protochlor tin, tart. ac., Muir. xxvi, 409; for traces (iod. pot., mur. ac.) Thresh. xxviii, 246.
- Bismuth, AMMONIO-CITRATE**, prep. Rother. (fr. subnitrate). xxiv, 332; Squibb, (fr. the simple citrate). xx, 260.
- ARSENIDE, Deschamps. xxvii, 367.
- BROMIDE, MacIvor. xxiii, 300.
- CITRATE (fr. subnitrate) Rother. xxiv, 332.
- HYDROXIDE, in Bolivia. xxx, 302.
- and IRON CITRATE, Rice. xxi, 148.
- LACTATE, Dutch, Phar. Soc. xxx, 392.
- NITRATE, cryst., correct formula, Yvon and Detta. xxvi, 411.
- OLRATE, Wolff. xxvii, 430; Killick. xxix, 306.
- OLEO-PALMITATE (fr. cryst. nitr.) Wolff. xxx, 360.
- OXIDE (heating subnitrate) Siebold. xxiv, 256.
- PERCHLORATE (basic), Muir. xxiv, 256.
- PHOSPHATE, preferable to the nitrate, Tedenat. xxix, 271.
- and POTASSIUM IODIDE (test for alkaloids), Thresh. xxviii, 58.
- and QUINIA IODIDE, Fletcher. xxvii, 506.
- SILICATE, (hydrated) in Bolivia. xxx, 302.
- SUBCARBONATE, pill excip. (manna), Fairthorne. xxx, 101—prep., Siebold. xxiv, 256.
- SUBNITRATE, adult. (28 p. c. phosph. lime). xix, 341—detect of arsenic (nitr. sod., nitr. silv.), Biltz. xviii, 227; freed fr. arsenic (ammonia), Heintz. xxiii, 300; (hot nitr. ac.), Schneider. xxviii, 246; xxix, 269—behavior to iod. pot., Woodman and Tidy. xix, 219—commercial analyzed, Owen. xix, 218—impurities: ammonia. xix, 219, 489; xxv, 263; lime. xxvii, 362; phosph. lime. xxix, 270; silver, subchlor. bismuth. xxi, 309—incompatible with alkaline bicarbon., and carbonates, Green. xxvii, 362—estimat. of nitr. ac., Baudrimont. xxix, 269—detect. of lead, Carnot. xxvi, 412; xxvii, 361; Chapuis and Linossier. xxvii, 361—pill excip., (manna), Fairthorne. xxx, 101—prep., Laliou. xxvii, 60; Siebold. xxiv, 255—variable composition, causes, Riche. xxvii, 360.

- Bissa-bol**—a kind of bdellium. xxv, 219; xxviii, 189, 195.
- Bistut, VIRGINIA**—*Polygonum virginianum*, Kansas. xxix, 449.
- Bitters, BOONEKAMPOF MAAG**—Salbach. xxx, 124.
- Bitter BUSH**—*Eupatorium villosum*, Jamaica. xxiv, 724.
- **NUT**—*Carya amara*, Kansas. xxix, 446.
- **SWEET** see **DULCAMARA**.
- **SWEET, FALSE**—*Celastrus scandens*, Kansas. xxix, 441.
- **WEED**—*Helenium puberulum*, Calif. xxvi, 698; xxvii, 604.
- **WOOD**—*Picraena excelsa*, Jamaica. xxiv, 733.
- Bixa ORELLANA**; see **ANNATTO**.
- Bixin**, prep. and prop., Hui. xxvii, 533.
- Bixaceae**. xviii, 290; xxv, 195.
- Black, ANILIN**, prep., Kielmayer; Schlumberger. xxiii, 431.
- Black BERRY**, adult. of powd. root. xxx, 576; see also **RUIUS VILLOSUS**.
- **BOARD**, liquid slating. xxviii, 97; xxx, 195.
- **DRINK**—*Ilex cassine*. xxiv, 200.
- **HAW**, adult. of powd. xxx, 576. See also **Viburnum prunifolium**.
- **JACK**—*Quercus nigra*, Kansas. xxix, 444.
- **LEAD**; see **GRAPHITES**.
- **ROOT**—*Pterocaulon pycnostachyum*, Georgia. xxvi, 227.
- **WASH** in itching piles, Close. xix, 489.
- **WOOD**—*Euxenia gyrata*, Chili. xxiv, 765.
- Blackening**. xxviii, 97, 98—gutta-percha. xxix, 114—liquid. xxvii, 127.
- Blair, A.** Drug mills. xxiii, 575.
- Blaney, Jas. R.**, letter about cinchoquinine. xxii, 646.
- Blanda**—Koumiss. xxi, 200.
- Blanquilla**, Arg. Republ. xxiv, 762.
- Blast apparatus** for laboratories, Hanks. xxvi, 59—steam, Thörner. xxx, 55.
- Blatta LAPPONICA**. xxvii, 287.
- **ORIENTALIS** in dropsy, Russia. xxvii, 286; xxviii, 369—in Greece. xxvii, 287.
- Blazing STAR**—*Liatris squarrosa*, Kansas. xxix, 442.
- Bleaching POWDER**, see **LIME, CHLORINATED**.
- Bledo**, Arg. Republ. xxiv, 762.
- Blephilia HIRSUTA**, Kansas. xxix, 446.
- Bletia CAMPANULATA**, Mexico. xxiv, 769.
- **TANKERVILLIA**, cont. indican, Schunck. xxvi, 624.
- Blisters CAMPHORATED** (paint with chlorof. sol.) Deschamps. xix, 151—pain lessened, Besnier. xxv, 62.
- Blistering BERTLES** of U. S. (158 spec. and var.) Gissler. xxix, 238—Chinese, Maisch. xx, 246.
- **IGELU**—*Mylabris cichorei*. xx, 249.
- **LIQUID**, (with acet. eth.) Deane. xxiv, 83.
- **TISSUE** (cantharidate pot.) Delpech. xviii, 291.
- Blood**, freed fr. albumen, Bernard. xxvi, 525—alkalinity due to bicarbonates, Power. xxix, 297—precip. of coloring matter (ammon., tannin, acet. ac.), Struve. xxi, 397—cont. 4 p. c. salt is not coagulable; may be filtered, Gautier. xxiv, 389—tests: Almén's guaiac, turp., best, Boettger. xxiii, 465; tungstate sod., Sonnenschein. xxii, 284—estimat. of urea, Yvon. xxvi, 642—yield fr. oxen and sheep. xxv, 323.
- **DRIED**, soluble, prep., Bon. xxvi, 627.
- Blood-wood GUM**, Queensland. xxvi, 741.
- **TREE**—*Eucalyptus corymbosa*, Queensland. xxi, 248.
- Bloom OF YOUTH**, Laird's, analysis, Mitch.; Risser. xxiv, 419.
- Blowpipe**, Rabs. xxiii, 41.
- with **CENTRIFUGAL fan**, Morrel. xxix, 44.
- **GAS**, Bente. xxvi, 70—Muencke. xxviii, 31.
- **PORTABLE**, Burgess (foot power). xxix, 45—Casamajor. xxiv, 58.
- **WATER**, Knoblauch. xxiii, 42; xxi, 152.
- Blowpipe WORK**, aluminium subst. for charcoal, Ross. xxvi, 68—best distance fr. mouthpiece, Berzelius. xxiv, 59.
- Blue** fr. **ALKALIT** (by carb. sod.) for syrups, liquors. xxvii, 127.
- **ANTIMONIC**, prep. (antim. not necessary). xxi, 312.
- Blue CHROME**, Bong. xxvi, 399.
- **MANGANESE**, Bong. xxvi, 392.
- **PRUSSIAN**, crystals, Gintl. xxix, 256—soluble (stable solut.) xxv, 252.
- **RUNGE'S** (chlor. lime, excess of anilin) Perkins. xix, 222.
- **THEVETIA**, prop. Warden. xxx, 183.
- **WASH**—, (ferroc. pot. better than oxal. ac.), Debrunner. xxv, 252.
- **GUM TREE** of Tasmania and Victoria—*Eucalyptus globulus*. xxi, 246, 8—of Western Australia—*Eucalyptus megacarpa*. xxi, 246—of California—*Eucalyptus globulus*. xxvi, 698.
- **MASS, POWDER**, Balluff (dextrin). xxii, 526—Bibby (sugar of milk). xxiv, 92—Hancock (exposure to air). xxii, 374; xxiii, 91—discussion. xxii, 525.
- Blumea AURITA**, India, account, Dymock. xxvii, 179.
- **BALSAMIFERA**, India. xxvii, 180—yields Ngai camphor. xxiii, 141—in China and Java. xxiv, 141.
- **HOLOSERICEA**, India, account, Dymock. xxvii, 180.
- Boa-tam-paijang**—*Sterculia scaphigera*, China. xxvi, 252.
- Boc-bookah**—*Daucus crinitus?*, Morocco. xxiv, 114.
- Bocconia CORDATA**, Japan. xxx, 233.
- Barner, E. L.** Colchicum seed, removal of fixed oil. xxvi, 760.
- Bohior**—*Eryngium tricuspidatum*, Morocco. xxiv, 114.
- Boi**—root of *Dorema ammoniacum*, Persia. xxiv, 154.
- Boiler**, rapid (five Runsen, the central used by itself), Symes. xxix, 47.
- Boiling LIQUIDS**, bumping prevented (current of gas) Müller. xviii, 205—(bent tube), Schumann. xviii, 205.
- under diminished press., Prescott. xviii, 205.
- simultaneously of two non-miscible liquids—(boiling point), Kundt. xix, 138.
- **POINT** (thermometer must only be inserted in the vapor, not in the liquid), Biel. xxvi, 473—apparatus for small quant., Powlewski. xxix, 48.
- Bois d'Arc**—*Maclura aurantiaca*. xxi, 261.
- Bokenul**—*Lobelia nicotianæfolia*, India. xxv, 155.
- Boldina**, fr. boldo, Bourgoin and Verne. xxi, 383.
- Boldo**, account, Verne. xxiii, 227; xxvi, 661—in Chili. xxiv, 765.
- Boldoa FRAGRANS**, Chili. xxiv, 765.
- Boletus CYANESCENS**, analyz., Ludwig. xxi, 203—cont. phenyl derivatives, Phipson. xxi, 203.
- **LARICIS**, see **AGARIC**, and **POLYPORUS OFFICINALIS**.
- **LURIDUS**, contains phenylamin, Phipson. xxi, 204.
- **LUTEUS**;—**B. SCABER**, cont. oxal. ac., Hamlet and Plowright. xxvi, 178.
- Bolivite**, in Bolivia. xxx, 302.
- Bombaceae**. xxi, 235; xxv, 182; xxviii, 169.
- Boneset**, see **EUPATORIUM PERFOLIATUM**.
- **FALSE**—*Kuhnia eupatorioides*. xxix, 442.
- Books** donated by Department of the Interior. xxi, 53—by J. J. Woodward. xxii, 497.
- Boo-kung**—*Eulalia Japonica*, Japan. xxviii, 104.
- Boomah nuts**, Natal—*Pycnocoma macrophylla*, descript., Holmes. xxvi, 316.
- Booroondi**—*Tiaridium indicum*, India. xxvi, 160.
- Boots**, waterproofing. xxvi, 157.
- Boracite**, Stassfurt. xxii, 186.
- Boran**—fruit of *Emblica officinarum*, Persia. xxi, 260.
- Borax**, fr. Borax lake, comp., McAdam. xviii, 228—in California. xix, 195; xxvii, 586; xxvii, 622—"concentrated," xxvii, 623—drug market, xxi, 428; xxii, 624; xxiv, 394; xxv, 351; xxvi, 654; xxvii, 557, 560; xxviii, 369; xxix, 371; xxx, 465—export and import statistics. xxviii, 229—fluidvolume, Candidus. xxvii, 709—solubl. in glycerin, Schulze. xxiii, 257—with glycerin and bicarb. sod. evolves carbon. ac. gas. xxvi, 498—in India, account. xxiv, 787—is innocuous as food preservative, Cyon. xxvii, 314; denied by Bon. xxvii, 314—dissolves magnes. carbon.,

Borax (Continued).

- Wittstein. xxiii, 278—as preservative of animal subst., Jacquez. xxi, 282—bitter taste with salicylic ac., Thresh. xxv, 292—and salicylic ac. compounds, Jahns. xxvi, 538—test: glycerin (liberates boric ac.), Iles. xxvii, 419—fr. "Teza." xviii, 227—destroys fermentat. power of yeast, Dumas. xxi, 400; denied by Petit. xxi, 400.
- Borates**, prep. (fr. alkaline chlor. in dry way), Ditte. xxii, 183—and glycerin, (green flame), Iles. xxiv, 226.
- Borbonia PARVIFLORA**, South Africa. xxii, 150.
- Boree-Ajmud**=*Apium graveolens*, India. xxvii, 192.
- Boric TRIETHIDE**. xxix, 253.
- Borneo-CAMPHE**n, Ribau. xxiv, 282.
- Borneol**, Berthelot; Kekulé. xxviii, 474—in several essent. oils. xxviii, 474.
- **HYDROCHLORATE**, Ribau. xxii, 214.
- Bornesite**, fr. Borneo caoutchouc, Girard. xxii, 249.
- Borocitrates**, Scheibe. xxix, 320.
- Boroglycerides**, Barff. xxx, 358.
- Boron**. xviii, 227; xix, 195; xxi, 282; xxii, 183; xxiii, 256; xxiv, 226; xxv, 250; xxvi, 361; xxvii, 314; xxviii, 229; xxix, 253; xxx, 280.
- **CRYSTALS** (of Wöhler and Deville), are a compound of aluminium, carbon and boron, Hampe. xxv, 250—ought to be put at the head of the vanadium group of elements, Etard. xxix, 253.
- Borragineae**. xix, 289; xxv, 143; xxvi, 210; xxvii, 164; xxviii, 128; of California. xix, 304; Kansas. xxix, 440; Mexico. xxiv, 772.
- Borrigo OFFICINALIS**, Chili. xxiv, 766—Malta. xxvi, 167.
- Boschjeman's tea**=*Methyscophyllum glaucum*, South Africa. xxii, 158.
- Boswellia BHAUDAGINA**, India. xxiv, 718.
- **PREKEANA** yields the elemi of old writers, Flückiger. xxvi, 296.
- **SERRATA**, resin, India. xxiv, 195—descript. and uses, Dymock. xxv, 218.
- Botan**=*Paeonia moutan*, Japan. xxviii, 164.
- Botanical SPECIMENS**, fr. Wallace Bros., on exhibit. xxi, 453.
- Botany Bay GUM**, see **ACAROID RESIN**.
- **BAY GUM TREE** (acaroid tree). xxx, 148.
- **BAY KINO** fr. *Eucalyptus resinifera*. xxi, 246.
- Botrychium LUNARIOIDES**, Kansas. xxix, 445.
- Bottles**, CAPPING: rosin, collod., Loulan. xxviii, 39; xxix, 57—gelatin, Diehl. xxvii, 380, note.
- **CLEANED** (iron cuts), Fordos. xxiii, 109.
- **CORKING** apparatus, Heyer. xviii, 204.
- **DRIED** quickly (alc., eth., air), Zettnow. xxi, 195.
- **FLINT GLASS**, act. of alkal. salts and carbonates. Frickhinger. xxvii, 59.
- **GREASY**, cleaned. xxx, 135.
- **WAX**, fr. residue of syr. tolu, Brown. xxix, 57.
- "**Bottom price**" fallacy, Bedford. xxi, 423.
- Bougies**, **GELATINE** (glass tube), Friedrichs. xxix, 112.
- **IODOFORM** (97 p. c.) gelatin (rolled on board), Müller. xxx, 113—Vulpus (moulded). xxx, 113.
- **MOULDS**, Mitchell. xxvi, 137.
- **NASAL** (carb. ac., tannin, zinc. sulph.). xxviii, 71.
- **SOLUBLE**, medicated, Mitchell. xxvi, 137.
- Bouquet**, CLARA KELLOGG; B. CHARLOTTE CUSHMAN;—B. LADY HAYS;—B. LUCCA, Dubelle. xxvii, 125.
- Bouvardia TRIPHYLLA**, Mexico, descript. and uses, Maisch. xxii, 120.
- Bowditchia MAJOR**, analysis, Peckolt. xxv, 232.
- "**Boxing**" turpentine. xxvi, 326.
- Boymia RUTECARPA**, Japan. xxviii, 168.
- Braço de preguiça**=*Solanum bullatum*, Brazil. xxiii, 120, 149.
- Brady, Hy. B.** representative of Brit. phar. conference. xix, 26—butter cacao for suppositories. xix, 83—commercial extract beef. xix, 79—extr. calabar beans. xix, 60—inviting internat. pharm. Congress. xix, 72—introductory remarks. xix, 27—suppositories. xix, 83—adult. of precip. sulphur. xix, 60, 61.
- **Discussion**: xix, 26, 60, 61, 72, 79, 81, 83, 92, 116.
- Brahea ARMATA**, California. xxvii, 138.
- Brahmi**=*Herpestes monniera* and *Hydrocotyle asiatica*, India. xxviii, 119.
- Brai LIQUIDE** (wood tar) xxvi, 325.
- Bramble leaves**, p. c. of ash. xxii, 137.
- Brandy**, detect. of caramel (albumen; sulph. iron), Carles. xxiv, 286.
- **California**. xxvii, 644, 655.
- **bitter**, Chinese. xxii, 33.
- Brasenia PELTATA**, Kansas. xxix, 448.
- Brass**, bronzing. xxviii, 98.
- "**WOOL**." (=cement plätt), Vulpus. xxvii, 547.
- Brayera ANTHELMINTICA**, descript. xxvi, 283. See also **KOUSSO**.
- Brazil**, Centennial exhibit., chemicals, xxiv, 797—pharm. prep. xxiv, 812.
- **drugs**, Holmes. xxiii, 120—pharmacy, Wheeler. xxiv, 447.
- **NUT**, account. xxiii, 208—cont. no cryst. albuminoids, Ritthausen. xxx, 449.
- **NUT**; see also **BERTHOLLEIA EXCELSA**.
- **POWDER**; see **ARAROA**. xxiii, 213.
- Brazilin** is a resorcin-succinin, Kopp. xxviii, 353.
- Brea**, fr. *Pinus teocote*, Mexico. xxiv, 768.
- Bread**, samples of unreliable English analyses. xxii, 318.
- of **COD-LIVER OIL**. xxii, 173.
- **GLUTEN**. xxix, 111.
- **ROOT**=*Psoralea esculenta*, Kansas. xxix, 447.
- Breidin** in elemi, Baup. xxiii, 217.
- Breweries**, California. xxvii, 623.
- Brewing** in JAPAN, Atkinson. xxvii, 402; xxviii, 363. See also **EUROTIN**.
- Briedelia MONTANA**, India, descript. and uses, Dymock. xxv, 225.
- Brier**, **COMMON GARDEN**=*Smilax rotundifolia*, Kansas. xxix, 451.
- **SENSITIVE**=*Schrankia uncinata*, Kansas. xxix, 747.
- Brill, W. H.**, report on drug market, Pittsburgh. xxi, 443.
- Brinhurst, Ferris**, portrait. xxiv—report on exhibition. xviii, 298.
- British Pharm. Conference**, exchange of greetings. xviii, 40; xxi, 25, 26—letter of introduct. of Hy. B. Brady. xix, 26.
- Bromal (HYDRATE)**, physiol. prop., Robertson. xix, 254; Steinhauer. xviii, 258; xix, 248—no advantage over similar remedies, Berti and Namias. xxi, 337—prep., Guyot. xxvi, 492—prop., Schering. xix, 248.
- Bromechicein**;—**BROMECHITEIN**;—**BROMECHITIN**, Jobst and Hesse. xxiv, 138.
- Bromeliaceae**. xxiii, 134; xxvii, 143.
- Bromides vs. HYDROBROMATES**, Bullock. xxiii, 703, 707.
- **EXTEMPOR** (fr. brom. bar. or pot. and sulphate), Bullock. xxiii, 705—McDonald. xxi, 294.
- Bromine**. xviii, 220; xix, 185; xxi, 279; xxii, 179; xxiii, 245; xxiv, 218; xxv, 243; xxvi, 353; xxvii, 306; xxviii, 318; xxix, 248; xxx, 272.
- **Act.** upon alcohols, Hardy. xxiii, 346; upon aldehyde, Pinner. xxiii, 346; upon resins, gum resins, balsams, Hirschsohn. xxvi, 456; upon sulphur. hydrog. (is unlimited), Naumann. xxvi, 353—behavior to solvents, Hager. xix, 189—American, statistics, Chandler. xix, 185; Garrigues. xxi, 650; xxii, 180; xxiii, 245—history, Wellcome. xxv, 448—yield (1 lb. fr. 12 bushels salt). xxi, 650—in analysis (as oxidiz. agent), Waage. xxi, 150—in California xxvii, 587—freed fr. chlorine, Adrian. xviii, 230; to replace chlor., Wagner. xxiv, 218—probably a compound, Mayer. xxviii, 219—contamin. with bromoform, Reymann. xxiv, 408; cyanogen (detect. by iron filings). Phipson. xxi, 489—drug market. xx, 116; xxi, 428; xxii, 623; xxiv, 395; xxv, 349—estimat. (in pres. of chlorine and iod. nitr. silv.), Field and Huschke. xviii, 221—from fresh-water plants, Zenger. xxiii, 246—for extract. gold fr. pyrites, Wagner. xxiv, 218—extraction fr. kelp, Galloway. xxvii, 307—for extract. mercury fr. ores, Wagner. xxiv, 218—found in crude mur. ac., Wittstein. xix, 184—preparat. of pure, (water, ether, dried starch paste), Adrian. xix, 186—for disting. betw. shale and petrol. products, Allen. xxx, 314—solidification (infusorial

Bromine (*Continued*).

- earth). xxviii, 221—solidifying point, Balard, Liebig, Kopp. xxviii, 221; Baumhauer. xxi, 279—solubility in water increased by brom. pot. xxix, 248—sp. gr. alters with temp., Crafts, Meyer, Lüblin. xxviii, 219—water "spritz," Reichardt. xxix, 272—still, Arvine. xxv, 243—test (sulphocy. am.), Volhard. xxvii, 322—test for chlor. and iod. (water, ether, nitr. silv.) Hager. xix, 186; for iod. (morph. sulph., chloroform), Jorisson. xxix, 248.
- Bromochloralum**, analysis, Lyons. xxiii, 521.
- Bromoform**, physiol. prop., Robertson. xix, 254—prep., Damoiseau. xxix, 295—sp. gr., Schmidt. xxvi, 491.
- Bromopicrin**, prep., Bolas and Groves. xix, 251.
- Bromus CILIATUS**;—**B. SECALINUS**, Kansas. xxix, 445.
- Bronze** for copper and brass. xxviii, 98.
- **LIQUID** (tuchsin, benzoic ac.), xxvii, 128; xxix, 114.
- Brooks, Fred.** Progress of the metric system. xxiii, 566.
- Broom-rope** = *Orobanche*. xxvi, 203.
- Brosimum GALACTODENDRON**, Venezuela. xxvii, 274.
- Brown, CINNAMON** (acid salt of chrysotoluidin), xxii, 275.
- **THALLIUM**, Salter. xxvi, 424.
- Brown, A. P.** Aloin. xxv, 401.
- **J. B.** Medicinal plants of Kansas. xxix, 438.
- **Robert J.**—unofficial prep. xx, 207—discussions. xix, 30, 32, 94, 109, 110; xx, 54, 70.
- (?) xxiv, 665, 683.
- **W. H.** Report on Baltimore drug market. xxi, 449; xxii, 642.
- Brucia**, act. of arseniate sod., Tattersall. xxviii, 324, 5; of sulphomolybd. am., Buckingham. xxi, 363; of chlor. water, perox. hydrog., chrom. ac., chlorin. soda, Schonn. xxi, 379; of chlorin. soda and lime, Wellcome. xxiii, 392; of ferric chlor., butter antim., stannous chlor., Godeffroy. xxvi, 559; of nitr. ac. and stannous chlor., Böttger. xxiii, 421; of sulphur. hydrog., Schmidt. xxiv, 343; of bichromate mixt., chlorin. lime, Hamlin, Jr. xxix, 324—as anti-septic, Pavesi. xxix, 335—detect. in beer. xxiii, 340—is a mixt. of strychnia bases, Husemann. xxvii, 507—colored crystalline compounds, Lindo. xxvi, 583—electrolysis, Bourgoin. xix, 223—estimat. (bism. and pot. iod.) Thresh. xxviii, 320—extract. by benzol, Boiraux and Leger. xxiii, 418—act. of light, Flückiger. xxvi, 577—micro-sublimating point, Blyth. xxvii, 483—for detect. nitr. ac. in potable water, Böttger. xxiii, 420—oxidation, Schoen. xix, 227—physiological activity compared to strychnia, Andral. xxv, 307—pure, (by fract. cryst.) Shenstone. xxv, 307; xxvi, 587; xxvii, 508—the physiol. act. of pure is not known yet, Shenstone. xxvi, 213—spectrum, Meyer. xxvii, 479, 482—converted into strychnia, Sonnenschëin. xxiii, 419, 420; (fallacious, Cownley. xxiv, 353; Shenstone. xxv, 307; xxvii, 507)—always cont. strychnia, Shenstone. xxv, 31, 307; xxvi, 587—separated from strychnia, Prescott. xxvi, 836; Shenstone. xxv, 307—test (sod. sulphhydrate) Cotton. xviii, 265; Dragendorff, (bichromate mixt.) xxvi, 589; Flückiger (protonitr. mercury). xxiii, 421; How, (sulph. ac., ferric chlor.) xxvi, 565; Pellegrini (mur., sulph. ac., soda, iod.) xxvi, 562—nitric ac. test is only an oxidation, Schoen. xix, 227.
- and **BILIARY ACIDS**, compd., Arbre. xxi, 371.
- **NITROPRUSSIDE**, Davy. xxix, 325.
- **TER-IODIDE**, Bauer. xxiii, 419.
- Brumata glue**. xxviii, 94.
- Brunella VULGARIS**, Kansas. xxix, 446.
- Bryoidin**, formula, Flückiger. xxiv, 283—in elemi, Flückiger. xxiii, 217; xxvi, 466.
- Bryonia DIOICA**, germinat. of seeds, Saunders. xxx, 566—crystall. subst., Koninck and Marquart. xviii, 282.
- **LACINIOSA**, India, descript. and uses, Dymock. xxv, 200.
- **TAYUYA**, Brazil. xxiv, 183. See also **TAYUYA**.
- Bryonicin**, Koninck and Marquart. xviii, 132.

Bryony, in China. xxiv, 749, 758.

— **AMERICAN**=root of *Convolvulus mechoacanna*. xix, 375.

Bryzopyrum DOUGLASSII, Calif. xxvii, 604.

— **SPICATUM**, Calif. xxvi, 707; xxvii, 604.

Buchanania LATIFOLIA, India. xxiv, 719.

Buchu, adult. of powd. xxx, 576—ash and soluble matter (cont. much manganese) Jones. xxvii, 206—cont. camphor, Flückiger. xxii, 132—oil probably cont. salicylic ac., Wayne. xxiv, 159; (a mistake; is diosphenol, Maisch. xxx, 213)—extract. of act. principle by benzin not possible, Remington. xxi, 593—may be exhausted by dilut. alcohol, Squibb. xxvi, 709—yield of oil, Osse. xxiv, 276—powdering by hand, Cummings. xxiii, 598.

Buck, George. On omission of internal revenue stamp. xix, 101.

Buckbean, detect. in beer, Dragendorff. xxx, 339; Hoffstädt. xxii, 227; Wittstein. xxiii, 341—loss in drying. xxi, 202.

Buckeye, CALIFORNIA = *Aesculus Californicus*. xxvii, 630.

— **RED**, see *AESCLUSUS PAVIA*.

Buckthorn=*Rhamnus lanceolata*, Kansas. xxix, 450.

— **CALIFORNIA** = *Rhamnus crocea*. xxvi, 698; xxvii, 637.

— **BARK**, see *RHAMNUS FRANGULA* and *FRANGULA*.

— **BERRIES**, see also *RHAMNUS CATHARTICA* and *R. INFECTORIA*—in Asia Minor, Stöckel. xxi, 258.

— **JUICE**, prop., Umney. xxiii, 220.

Buckwheat, CLIMBING=*Polygonum convolvulus*, Kansas. xxix, 449.

Buddleia GLOBOSA, Chili. xxiv, 765; Mexico. xxiv, 772.

— **MADAGASCARIENSIS**, Mauritius. xxiv, 741.

— **VERTICILLATA**, Mexico. xxiv, 772.

Buffalo berry=*Shepherdia argentea*, Utah. xxvii, 146.

Bukexrern=*Verbena officinalis*, Malta. xxvi, 167.

Bulbij=seeds of *Abutilon indicum*, India. xxv, 182.

Bullock, Charles. Annual address. xxv, 474—Inaugural address. xxiv, 596—Bromides and hydrobromates. xxiii, 703—on alteration of the constitution. xxi, 37, 8—organizations entitled to representat. in Am. Phar. Association. xxi, 32—phosphoric acid. xxiii, 812, 3—*Veratrum viride* and alkaloids. xxv, 523.

— Discussions: xxi, 29, 32, 33, 37, 38, 62, 64, 69, 83, 97; xxiii, 753, 754, 756, 791, 793, 811, 812, 813, 820, 823, 824, 832, 837, 838, 839; xxiv, 570, 596, 600, 613, 616, 617, 623, 651, 656, 657, 659, 660, 675, 680; xxv, 502, 503, 514, 523, 529, 535, 537, 539; xxix, 521; xxx, 600, 632, 637, 646, 664.

Bully tree yields balata, Brazil. xxvi, 220—*Sapota Mülleri*. xxx, 187.

Bully tree GUM=*Balata*. fr. *Sapota Mülleri*, Honduras. xxx, 186.

Bulrush=*Scirpus lacustris*, Kansas. xxix, 444.

Bunchflowers=*Melanthium virginicum*, Kansas. xxix, 447.

Bupleurum OCTORADIATUM, China. xxiv, 752.

Burgundy pitch, see **PITCH, BURGUNDY**.

Burdock, see **BARDANA**.

Burette. xviii, 205—Scheibler (construct. and verification). xxix, 32—Røder (apparatus for filling). xxx, 28—Squibb (necessary outfit). xxi, 541.

— **STAND**, Pribram. xxii, 42—Squibb. xxi, 541; xxii, 42.

— **VALVE**, Koenig. xxiii, 38—Pellet (glass ball in rubber tube; pinched). xxix, 32.

Burner, BUNSEN, (glass tube) Biedermann. xxvii, 51—simplified, Ebell. xxvi, 68—non-retreating flame, Morton. xxiv, 65.

— Godeffroy (four concentric cylinders). xxvi, 68.

— **GAS**, horizontal solid flame, Fletcher. xxviii, 30.

Burning FLUIDS, dangerous (test by match), Foote. xxi, 143.

Burns, glycerin, Koller. xxviii, 286—glue, glyc., carbol. ac., Rice. xxiv, 88—Buck's mixture, (acac., trag., molasses). xxiv, 88—oil peppermint. xxviii, 266—iodof., carbol. ac. xxv, 66—(hydrofluoric acid) waterglass, Robbins. xxx, 277—(sulph. ac.) calc. magnes. paste. xxix, 244.

- Burra-Gokhroo**—*Pedaliu murex*, India. xxv, 146.
- Burseraceae**. xxiv, 194.
- Busch quash**—gallnut of *Pistacia vera*, Turkestan. xxi, 258.
- Bush tea**—*Cyclopia genistoides*, South Africa. xxii, 150.
- Bushi**—a spec. of aconite, Japan. xxix, 173.
- Business council** proposed. xxvii, 784, 792; xxviii, 592—see COUNCIL.
- Butea FRONDOSA**, India. xxiv, 718; xxviii, 195.
- Butter**, adult. (lard, palm oil, tallow). xxii, 318—fallacies of English analysts. xxii, 318—analysis (Hehnert, modif.), Reichert. xxvii, 425—ancient (2500 and 1000 years), analysis, Wigener and Church. xxviii, 290—comp., Wein. xxix, 305—sp. gr., Hager. xxvii, 424.
- ARTIFICIAL. xxi, 501.
- of ANTIMONY, see LIQ. STIBII CHLORAT.
- CACAO, adult. xxi, 479—detect. of adult. (ether the best), Ramsperger. xxiv, 527—examin. of commercial, Ramsperger. xxiv, 531—purified, Hirschberg. xxiii, 194—test of purity (ether; benzin; congealing temp.), Lamhofer. xxv, 281—sp. gr., Hager. xxvii, 424; Dieterich. xxx, 363—for suppositories, Brady. xix, 84; discussion. xviii, 83—yield, Lamhofer. xxv, 281.
- Fly Plant—*Bahia arachnoides*, California. xxvi, 698; xxvii, 608.
- Nut, see JUGLANS CINEREA.
- POWDER, Lemmel's analyzed, Fuchs. xxiii, 522.
- SHEA—, fr. *Butyrospermum Parkii*, account, Holmes. xxvii, 430.
- Tree, Indian—*Bassia butyracea*, India. xxvi, 219.
- Wort—*Pinguicula vulgaris*. xxx, 162.
- Button BALL**—*Platanus occidentalis*, Kansas. xxix, 449.
- SNAKE ROOT—*Liatris spicata*, Kansas. xxix, 442.
- Butua**—*Chondodendron tomentosum*, Brazil. xxiii, 120—descript., Holmes. xxiii, 180.
- Butyl ALCOHOL**, yields iodotorm, Hager. xxx, 346.
- CHLORAL, see CROTON CHLORAL.
- Butyrospermum PARKII**, Africa. xxvii, 430.
- Buxin**, identical with pelosin and bebeerin, Flückiger. xviii, 288—as substitute for quinia, Kämmerer. xxvii, 581.
- sulphate. xviii, 266.
- Byakura**—*Solanum indicum*. xxviii, 120.
- By-laws**, amendment. xviii, 87, 94—about COUNCIL: xix, 113, 114; indefinitely postponed. xx, 51, 53; committee appointed. xxvii, 793; report. xxviii, 529. See also COUNCIL.
- about council examining credentials. xxx, 615, 630—delegates' initiation fee. xxvii, 801, 2—revision committee appointed. xxiii, 825; report. xxiv, 600.
- Amendments: Chapt. I, ART. IX. xxi, 93—Chapt. II, ART. I. xxi, 96; xxii, 541—Chapt. IV, ART. IV. xxi, 96; xxii, 541; xxv, 545—Chapt. V, ART. I. xxi, 73—Chapt. VI, ART. I. xxiv, 600, 656; xxviii, 530; xxx, 650—ART. II. xxvii, 783; xxviii, 532—ART. III. xxviii, 534—ART. IV. xxv, 529; xxvi, 889; xxviii, 535—ART. V. xxviii, 535—ART. VI. xxi, 30, 32; xxviii, 535; xxx, 616, 630—ART. VII. xxviii, 535—ART. VIII. xxviii, 535—ART. IX. xxviii, 538—ART. XI. xxiv, 600, 655—ART. XII. xxiv, 600—Chapt. VII, ART. I. xxiii, 795; xxiv, 655—ART. II. xxii, 541; xxviii, 542—ART. III. xviii, 94; xx, 110; xxi, 30, 32—ART. V. xxvi, 890; xxvii, 799—ART. VI. xxiv, 670—ART. X. xxv, 513—Chapt. VIII, ART. II. xxii, 522, 543; xxviii, 538—ART. III. xxvii, 783, 803; xxix, 490, 515—ART. IV. xxx, 650—ART. V. xxvi, 891—ART. VI. xxx, 616, 630, 650—Chapt. IX, ART. III. xxix, 490, 515—ART. VI. xxx, 616.
- Bysabol Gugal**—Indian bdellium. xxv, 219; xxviii, 189, 190.
- Byttneriaceae**. xxiii, 194.
- C**
- Caa-cuyo**;—CAA-GAZU;—CAA-MIRI, Brazil, varieties of maté. xxvi, 299.
- Cabeljau**—*Gadus morrhua*. xxviii, 207.
- Cabello DE ANGEL**, Arg. Republ. xxiv, 762.
- Cabureiba**—*Myrocarpus fastigiatus*, South America. xxvii, 242.
- Cacalia ATRIPPLICIFOLIA**, Kansas. xxix, 442—C. FLEXUOSA, Mauritius. xxiv, 741—C. TUBEROSA, Kansas. xxix, 442.
- Cacao**, assay, Heintz. xxvi, 255—contains copper, Duclaux. xxi, 235—estimat. of theobromin, Wolfram. xxxii, 514—Jamaica. xxiv, 735—soluble. xxx, 69.
- BUTTER, see BUTTER, CACAO.
- CREAM, Glenn. xxii, 59.
- Cachets de pain**, see WAFER CAPSULES.
- Cachous AROMATIQUES**. xxx, 69.
- Cacotheline** of Laurent. xxiv, 354.
- Cactaceae**. xix, 276; xxii, 144; Kansas. xxix, 440: Mexico. xxiv, 775.
- Cact. ana**—spec. of *Armeria*, and of *Daucus*, Morocco. xxiv, 114.
- Cactus FIG**, examinat., Popp. xix, 276.
- OPUNTIA, as food in Algeria. xxii, 144.
- Cadmium**. xxi, 304; xxiii, 296; xxvii, 355; xxviii, 245.
- act. on nitric ac., Acworth and Armstrong. xxvi, 343—separat. fr. copper in analysis (hyposulph. sod.), Vortmann. xxx, 299—estimat. (electrolysis of cyanide), Beilstein and Irwin. xxviii, 245—metallic, as a lecture exp., Kämmerer. xxiii, 296—sep. fr. zinc and estimat. (by metallic zinc), Kupferschläger. xxx, 299.
- AMIDOSULPHONATE, Berglund. xxvii, 332.
- ARSENIDE, Deschamps. xxvii, 367.
- BROMIDE, solubl. in alcohol, Candidus. xxx, 565.
- CHLORIDE, soluble in anhydr. ether, Skey. xxvi, 477.
- and POTASSIUM IODIDE (as test for alkaloids), Lepage. xxv, 298.
- SELENIDE, Marcottet. xxvi, 352.
- SULPHIDE, adult. (zinc white), Schering. xxi, 304—soluble in sulphide ammonium, Ditte. xxvii, 355.
- TELLURIDE, Marcottet. xxvi, 408.
- TUNGSTOBORATE, Klein. xxx, 301.
- Caerulignon**, in crude pyrolign. ac., Liebermann. xxi, 394.
- Caesalpinia CACALACO**, Mexico. xxiv, 776.
- CORIARIA, India. xxiv, 718—Jamaica. xxiv, 736—pods, yield of tannin. xxiv, 191.
- ECHINATA, probable source of araroba. xxiii, 214.
- SAPPAN, India. xxiv, 716—Jamaica. xxiv, 736.
- Caesium**. xxiii, 273; xxvi, 382; xxvii, 332; xxx, 290.
- equivalent, Godeffroy. xxvii, 322—isolated, Setterberg. xxx, 290—fr. lepidolite, Sharpless. xxiii, 273—test (stannous chlor.), Sharpless. xxiii, 273.
- AURIC CHLORIDE, Godeffroy. xxvi, 383.
- HYPOPHOSPHITE, Short. xxx, 278.
- MANGANOUS CHLORIDE, Godeffroy. xxvi, 382.
- PALLADIOUS CHLORIDE, Godeffroy. xxvi, 382.
- SILICO-MOLYBDATE, Parmentier. xxx, 301.
- Café CHILEN-CHILE**—*Cassia occidentalis*, Colombia. xxix, 209.
- Caffeina**, act. of ferric chlor.; butter antim.; stannous chloride, Godeffroy. xxvi, 559—of sulphomolybdate ammon., Buckingham. xxi, 369; of bichrom. mixt., and chlorin. lime, Hamlin, Jr. xxix, 324—decomposition products, Schmidt. xxix, 343—doses. xxvi, 601—drug market. xxviii, 369; xxix, 371—estimat.: chlorof., Lieventhal. xxi, 382; bism. pot. iod., Thresh. xxviii, 320—hypodermic solut., Powers. xxvii, 93—yields chloride of methylammon. xix, 283—oxidat. products, Maly and Bücheregger. xxix, 344—preparation (acet. lead), Phar. Soc. Paris. xxv, 311; (magnesia, chlorof.), Commaile. xxiv, 363; (chlorof.), Aubert. xxi, 381; fr. guarana (litharge), Greene. xxvi, 600; Feemster. xxx, 569; (magnes., ether), Mulder; Würthner. xxi, 380—influence of roasting temp., Aubert. xxi, 381—soluble in alcohol, Lafean. xxix, 324—test: sulph. ac., ferric chlor., How. xxvi, 561—fr. xanthin, Fischer. xxx, 431—yield fr. guarana, Feemster. xxx, 569—yield fr. maté, Byasson. xxvi, 300; Arata. xxv, 222.
- see also THEINA.

- Caffeina**, ACETATE; —C. BUTYRATE, Schmidt. xxix, 344.
 — CITRATE, exist. denied, Schmidt; proven, Lloyd. xxix, 344; denied, Hager. xxv, 310.
 — FORMIATE, exist. denied, Schmidt. xxix, 344.
 — ISOVALERIANATE, Schmidt. xxix, 344—exist. denied, Hager. xxv, 310.
Caffeidina and salts, Schmidt. xxix, 343—decomp. by baryta, Schultzen. xix, 231—yields sarkosina, Rosengarten. xix, 231.
Caffeol, Bernheimer. xxix, 165.
Cairphul = *Xanthoxylum rhetsa*, India. xxv, 180.
Cajeputol, Schmidt. xxiii, 332.
Calabar Bean alkaloids, Harnack and Witkewsky. xxvi, 293—drug market. xix, 402; xxi, 434; xxviii, 369; xxix, 371—preparations, Kennedy. xxiii, 602; xxiv, 192—cont. physosterin, Hesse. xxvii, 257—prop., Enz. xviii, 282—fr. several species in commerce, Holmes. xxvii, 255.
 — see also **PHYSOSTIGMA**.
Calabarina, antagonized by chloral hydrat, Husemann. xxvii, 507—physiol. act., Harnack and Witkewsky. xxvi, 293.
Caladinum SEGUINUM, descript. and uses, South America. xxvi, 180.
Calaguala, Arg. Republ. xxiv, 763; Mexico. xxiv, 769.
Calamine, prop. of medicinal, Tilbury Fox. xxiii, 296—in Italy. xxx, 298—artificial, Rosenstadt. xxii, 58, 198.
Calamus, act. of sulph. ac. and alc., Doliber. xix, 444—adult. of powd. xxx, 576—as diuretic in Turkestan. xxi, 263—loss in drying. xxi, 203—yield of oil, Osse. xxiv, 276—descript. and uses in India, Dymock. xxix, 118.
Calancapatle = *Solidago montana*, Mexico. xxiv, 774.
Calcium. xviii, 232; xix, 203; xxi, 295; xxii, 193; xxiii, 277; xxiv, 241; xxvi, 384; xxvii, 332; xxviii, 237; xxx, 291.
 — test (sod. tungstate), Sonstadt. xxviii, 237.
 — See also **LIME**.
 — AMIDOSULPHONATE, Berglund. xxvii, 331.
 — ACET., dissolves sulphate lead, Debbits. xxii, 200.
 — BENZOATE, Shinn. xxix, 314.
 — BISULPHITE, manuf. and uses, Weatherlee. xix, 193.
 — BORATE, Ditte. xxii, 184—deposit in Nevada. xix, 195.
 — BORO-DISALICYLATE, Jahns. xxvi, 539.
 — BROMIDE, adult. (lime), Maisch. xxiii, 514—home-made, cost. xx, 206—prep.: brom. am., milk lime, McDonald. xxi, 295; hydrobr. ac., calc. carb., Mercein. xxi, 141; bibrom. sulph., calc. carb., Rother. xxii, 180.
 — CARBONATE (natural), solub. in carbonated water, Cossa. xix, 204—precip. aided by stirring, Drechsel. xxvii, 334; adult. (chalk) xix, 344—prop. of basic, Raoult. xxx, 291.
 — CARMINATE, Guignet. xxi, 393.
 — CHLORHYDROPHOSPHATE. xxiv, 105.
 — CHLORIDE, absorbs 50 p. c. ammonia. xxiii, 274; contamin. with caustic lime. xix, 343—decomp. by water, Dibbits. xxvii, 334—fluid volume, Candidus. xxviii, 420—home-made cost. xx, 206—soluble in anhydrous ether, Skey. xxvi, 477—rise of temp. by dissolving anhydrous in water, Dette. xxvi, 384—is waste-product in ammon.—soda manuf., Gluga. xxvii, 335.
 — CHLORIDE, CAMPHORATED, solut., Pavesi. xxx, 90.
 — CITRATE, solub., constit., prop., Warrington. xxiv, 330.
 — DICHLOROPROPIONATE, Backunts and Otto. xxvi, 533.
 — DITARTRATE, Warrington. xxiv, 334.
 — GAMBOGIATE, Costelo. xxvii, 210.
 — GLYCYRRHIZATE, Seelini. xxviii, 345.
 — HYPOCHLORITE, Kingzett. xxiv, 217—cryst., Kingzett. xxiii, 243; see also **LIME**, CHLORINATED.
 — HYPOPHOSPHITE, fluid volume, Candidus. xxvii, 709—test for purity, Patrouillard. xxv, 249.
 — IODATE, antiseptic and disinfect., Sonstadt. xxii, 182.
Calcium IODIDE, adult. (iodide pot.), Menière. xxii, 182—prep. fr. sulphide calc., Menière. xxii, 181.
 — and IRON MECONATE, Rennie. xxix, 315.
 — ISOVALERIANATE, Schmidt. xxvii, 457.
 — KINOATE, Dutch Phar. Soc. xxx, 394.
 — LACTO-PHOSPH. (for artif. dentine) xxvi, 544.
 — LEVULOSATE, Peligot. xxix, 310.
 — MONOPHOSPHATE, hygroscopic, Birnbaum. xxii, 193.
 — MORPHINATE, Chastain. xxx, 401.
 — OXALATE, dilute solut., soon decomp. to carbon., Fleury. xxvi, 549—artif. (similar to plant crystals), Vescque. xxiii, 386.
 — PHOSPHATE, administr. (mur. ac.), Coirre. xxii, 194—contamin. with oxychlor. lead, Duquesnel. xxi, 496—hydrated, affinity for colors, Collas. xxi, 284—glass (heating acid ph. calc.), Sidot. xxvi, 387—freshly precip., dissolved by albumen solut., Mercadente. xxiv, 388—prep.: fr. calc. bones, (Ph. Germ.) best formula, Støeder. xxvi, 386; chlor. calc., phosph. sod., Reichardt. xxi, 295; as by-product in manuf. of glue, Vogel. xxiii, 277; therapeutically best by phosph. sod. and excess chlor. calc., Hirschsohn. xxvi, 385—prop. of dicalc. phosph., Millot. xxix, 253—therapeut. uses, Dusart. xxviii, 298—basic salt, Falières. xxiv, 241.
 — and POTASSIUM DOUBLE-SULPHATE, Hanney. xxvi, 384.
 — SALICYLATE, Davidson. xxx, 389—physiol. effect, Hutchins; James. xxix, 314.
 — and SODIUM SULPHATE, crystall., Folkard. xxx, 292.
 — SULPHATE, solub. in sulph. ac., Struve. xviii, 224.
 — SULPHOCHROMITE, Græger. xxx, 297.
 — SUPERPHOSPHATE, Horsford's, Ott. xxiii, 277.
Calculi (urinary) of cattle (lithurate of magnesia). xxi, 404.
Calder, A. L. discussions: xxiii, 780, 838, 839; xxiv, 615; xxv, 514, 535, 537, 538, 541.
Caldwell, Jas. M. Pharmacy in the So. States. xviii, 96, 194.
Calendula OFFICINALIS, adult. (*Tagetes erecta*), Maisch. xix, 334—analysis of ash of flowers, Semenoff. xxv, 157—germinat. of seed, Saunders. xxx, 566.
Caliche, Peru. xxiii, 248; xxiv, 238.
California, drug market. xxiv, 401—exports. xxvii, 646—medical flora. xix, 297; xxvii, 598—medicinal plants exhibited. xxvi, 698—manufacturers. xxvii, 619—meeting. xxx, 631—pharmacy, Wenzell. xviii, 198—pharmacy law. xix, 314; xxvi, 664; xxviii, 581; xxix, 375—natural wealth, Steele. xxvii, 583.
Californina (of Winkler) is a mixt. of loturia, loturidina, colloturia, Hesse. xxvii, 174.
Calisaya, see **CINCHONA CALISAYA**.
Callanthe VERATRIFOLIA, cont. indican, Schunk. xxvi, 624.
Callitrichaceae, Kansas. xxix, 440.
Callitriche VERNA, Kansas. xxix, 440.
Calomel, act. of bromides, Kuhn. xxiv, 261; of hyposulph. sod. xxiii, 308—adult. (gypsum, powd. mica), Japan. xxiv, 260—act. of trituration, boiling water, etc., Cornin. xxvi, 417—conversion into corros. sublimate (gastric juice, salt, citric ac., etc.), Slop. xxvii, 371; (heat, light, mur. ac., etc.), Jolly. xxvi, 417; (depends much on temperature), Hoglan. xxix, 278; (and on moisture), Vulpius. xxvii, 372; (sugar, bicarbon. sod.) xxi, 314—conversion denied after 9 months' trial, Merres. xxix, 279;—after 30 months, Wœllmer. xxx, 306—decomp. by alkalis and their carbonates, Slop. xxvii, 372—manuf. in China and Japan, Geerts. xxiv, 260—molecular weight, Adling, Marignac, Debray, Fileti. xxx, 307—act. of ozone, Mailfert. xxx, 258—pill excipient, Fairthorn. xxx, 101—preparation: wet way, Oldberg. xix, 208; oxal. ac., sublimate, sunlight, Unoth. xix, 209—density of vapors, Debray. xix, 209—"Western." xxii, 483.
Calophyllum CALABA, Jamaica. xxiv, 732.
 — ELATUM, India, descript. and uses, Dymock. xxv, 184—analysis of gum, Lyons. xxv, 184.

- Calophyllum INOPHYLLUM**, India, descript. and uses, Dymock. xxv, 184; Holmes, xxvi, 256.
 — **SPURIUM**, India, descript. and uses, Dymock. xxv, 185.
Calosanthus INDICA. xxiii, 120 — descript. and uses, Dymock. xxv, 146.
Calotropis GIGANTEA, India. xxiv, 139; xxvii, 237 — descript. and uses, Dymock. xxviii, 139. See also **MUDAR**.
 — **PROCERA**, India, descript. and uses, Dymock. xxviii, 139.
Calumba, see **COLUMBO**.
Calvin, John, Mayor of Indianapolis, address of welcome. xxvii, 746.
Calycin, fr. **Calycium chrysocephalum**, Hesse. xxix, 353.
Calycium CHRYSOCEPHALUM, act. principle, Hesse. xxix, 353.
Calystegia SEPIUM, Kansas. xxix, 443—California. xix, 305.
 — **SOLDANELLA**, California. xix, 305.
Camalote, Arg. Republ. xxiv, 764.
Camassia ESCULENTA, California. xix, 307.
Camboe, see **GAMBOGE**.
Camelina SATIVA, seeds in Baltic linseed, Holmes. xxx, 215.
Camellia JAPONICA, constituents of seeds, Katzujama. xxvii, 209.
Camellin, Katzujama. xxvii, 209.
Camock's FLAX (1610). xix, 492.
Campanula GLAUCA, Japan. xxviii, 142.
Campanulaceae. xxv, 155; xxviii, 142.
Campbell, Samuel. Percolation. xxiii, 599.
 — discussion. xxvii, 787, 788.
Camphen, fr. camphor. Ribau. xxiv, 282.
 — **BORNEO**—, Ribau. xxiv, 282.
 — **HYDROCHLORATE**, Ribau. xxii, 214.
Camphol, Berthelot. xxviii, 474.
Camphor, and chloralhydrat, liquid. xxi, 146; xxii, 232; is more a mechanical than a chemical combination, Saunders. xxv, 277; Squibb. xxv, 525; solubilities, Saunders. xxv, 277—color reactions, Kossov. xxvi, 434—compressed, Simes. xxiii, 144; xxx, 333—drug market. xix, 400; xx, 122; xxi, 437; xxii, 624; xxiv, 395; xxv, 341, 348; xxvi, 655; xxvii, 559, 560; xxviii, 369; xxix, 371; xxx, 465—estimat. (bisulph. carbon.), Hager. xxi, 211; 324—soluble in eucalypt. oil, Osborne. xxvii, 234—fluid volume, Candidus. xxvii, 709—explodes gun-cotton, Seeley. xix, 261—vivifying effect upon germin. of plants. xxii, 168—hypodermic sol., Rhode. xxvii, 93—powder (sugar of milk), Bibby. xxiv, 96; (subl. with steam), Lowd. xxi, 127, 441; (glycerin), Ebert. xxii, 81—refining in Philadelphia, Simes. xxiii, 144; xxx, 333.
 — **ANISE**, Landolph. xxiv, 281.
 — **BORNEO**, (fr. *Dryobalanops* and fr. *Laurus*.) comparat. exam., Kaehler. xxvi, 445.
 — **FORMOSA**. xxi, 210.
 — **JAPAN**, fr. *Laurus camphoratus*, Roretz. xxiv, 129.
 — **NGAI**, fr. *Blumea balsamifera*. xxiii, 141; xxvii, 180—prop., Plowman. xxiii, 141.
 — **RUBIA**, fr. madder, Jeanjean. xxiii, 143.
 — compound with **ALDEHYD**, Cazeneuve. xxx, 334.
 — **ARTIFICIAL**, fr. camphen, Ribau. xxiv, 282.
 — **BIBROMATED**, Montgolfier. xxiii, 330.
 — **BROMATED**, toxic effect, Rosenthal. xxx, 334.
 — **CYANATED**, Haller. xxviii, 268.
 — **CYANO-BROMATED**, Haller. xxviii, 268.
 — **ICE**, Covell. xxiii, 47; xxv, 66—mould (glass tubings), Fairthorne. xxx, 54—and glycerine, Mynster. xxvii, 68.
 — **METANETHOL**, constitution, Perrenoud. xxvi, 444.
 — **MONOBROMATED**, hypodermic sol., Bourneville. xxiii, 76—in delirium, Hammond. xxi, 149—prep. without distill., Clin. xxiv, 283—preparat., Dubois. xxiii, 328; Gault. xxiii, 327; Keller. (chlorof.) xxviii, 266; Linthicum (Maisch best). xxv, 273; Lloyd. xxiii, 329; Maisch. xxi, 324; Perkins. xxi, 325—dispensed in fixed oil, Patrouillard. xxvi, 445—prop., Montgolfier. xxiii, 320—antidote to strychnia, Valenti y Vivo. xxiii, 330—yields thymol by act. of chlor. zinc, Schiff. xxix, 287.
Camphor MONOIODATED, Haller. xxviii, 267.
 — **SALICYLATED**. xxx, 334.
Camwood in castor oil is fluorescent, Horner. xxiii, 461.
Canada, chem. manuf. xxv, 339—drugs. xxv, 335—drug market. xxv, 335—medicinal plants, Saunders. xviii, 107, 182—milling. xxv, 336—pharmacy law. xix, 354, 366—pharmacy, Saunders. xix, 429—tariff (discriminat. betw. root and top). xxv, 336.
Canada, SNAKE ROOT, see **ASARUM CANADENSE**.
Cananga ODORATA, Southern Asia, account, Flücker. xxix, 189. See also **YLANG**.
Canarium BENGALENSE, India. xxiv, 196.
 — **COMMUNE**, resin and oil, India. xxiv, 195, 6.
 — **STRICTUM**, India. xxiv, 196, 718.
Canary SEED, drug market. xxiv, 395; xxv, 351; xxvi, 660; xxvii, 560, 567; xxx, 465.
Canchalagua, Arg. Republ. xxiv, 764—=*Erythraea venusta*, Calif. xxvii, 607—=*Erythraea stricta*, Mexico. xxiv, 773.
Canchi—juice of *Coriaria thymifolia*, New Granada xxi, 258.
Candidus, P. C. Fluid volumes of solids. xxvii, 709, 806; xxviii, 420—solubility of chemicals in alcohol. xxx, 564.
 — discussion. xxvi, 898; xxvii, 786; xxviii, 553; xxx, 621, 622, 634.
Candles, manuf. in California. xxvii, 623.
 — **BERRY TREE**—*Aleurites triloba*, Jamaica. xxiv, 732.
 — **NUT**, see **ALEURITES TRILOBA**.
 — **TREE**—a spec. of *Parmentiera*, Mexico. xxvii, 156.
 — **WOOD**—*Cassia emarginata*, Jamaica. xxiv, 736.
Canna DISCOLOR;—*C. INDICA*;—*C. LUTEA*, India. xxv, 129.
Cannabin, act. of nitr. ac., Bolas and Francis. xix, 291—prep. and prop., Siebold and Bradbury. xxx, 251.
Cannabinese, Mexico. xxiv, 770.
Cannabis INDICA, India, account. xxiv, 725; xxv, 228—active principles extracted by fat. xxii, 161—hypodermic sol., Eulenberg. xxvii, 94—chem. examin., Siebold and Bradbury. xxx, 251—cont. haschicin, Gastinel Bey. xxii, 16—contains nicotin, Prochrichensky. xxvii, 267; denied by Seezen. xxix, 234.
 — **SATIVA**, contains no nicotin, Seezen. xxix, 234—products, Jackson. xxi, 261—in Kansas. xxix, 542.
Cañan—*Misodendron macrophyllum*, Chili. xxiv, 765.
Cantharellus AURANTIACUS, cont. oxalic ac., Hamlin and Plowright. xxvi, 178.
Cantharidal VESICANT, acetic. xxv, 90.
Cantharides, American, Saunders. xxiii, 818; xxiv, 505; Gissler (158 spec.), xxix, 238—adult. of powd. (burnt acorns), xxi, 486;—xxx, 576;—suspicious price. xxiv, 394—cantharidin not the only vesicating principle, Squibb. xix, 457—drug market. xix, 400; xx, 121; xxii, 624; xxiv, 395; xxv, 347; xxvi, 655; xxvii, 557, 560—female more valuable than male; eggs and blood most active, Saunders and Horn. xxiv, 509—young ones destitute of activity, Nentwich. xix, 313—preparations, assay (difficult). Maisch. xxi, 647.
 — see also **BLISTERING BEETLES**.
Cantharidin, act. of arseniate of sod., Tattersall. xxviii, 325—is an anhydride, Dragendorff. xviii, 291—exists in the free state in cantharides, Beguin. xxiv, 378—present as cantharid. ammon., Wolff. xxv, 30, 237—is found in the aqueous distillate, Rennard. xix, 267, 389—EXTRACTED: Boiraux and Leger (coal oil). xxiii, 451; Dieterich (dialysis). xxviii, 350; Dragendorff (magn., dil. sulph. ac., eth.). xx, 255; (pot., mur. ac., benzin, chlorof.). xxvii, 287; (sod., mur. ac. chlorof., ether). xxviii, 206; Galippe (acet. eth.). xxiii, 450; Greenish (prev. treatment with caust. alkali). xxviii, 206; Maisch (review). xx, 254; Proctor (chlorof.). xx, 255; Rennard (magnes., chlorof., dil. sulph. ac., eth.). xx, 256; Robiquet (water, alc., eth.). xx, 254; Romberg (dil. sulph. ac., alc.). xxi, 177; Squibb (chlorof., bisulph. carb.), (pot., alc.).

Cantharidin (*Continued.*)

xix, 459, 461; Thierry (ether-alc.). xx, 255; Wolff (acet. eth.). xxv, 237—hypodermic use, Laboulbène. xxvii, 351—micro-sublimating point, Blyth. xxvii, 483—in ointments and plasters (dissolve in eth. or chlorof.), Dieterich. xxx, 65—prop. xx, 63; Piccard. xxvi, 614—solubilities, Maisch. xxi, 647—as substitute for cantharides (1:200). xxx, 444—yield, Maisch. xx, 256, 257, 258; fr. *Mylabris chicorei* and *Cantharis vittata*, Fahnestock. xxvii, 287.

Cantharis NUTTALLII. xxiv, 509.

— **VESICATORIA**. xxiv, 508—history fr. egg to insect, Lichtenstein. xxvi, 330.

— **VITTATA**, yield of cantharidin, Fahnestock. xxvii, 287.

— **VULNERATA**. xxiv, 508.

Caoba = fruit of *Swietenia mahogany*, Central America. xxvi, 269.

Caoutchouc, production. xviii, 285—cemented to metal. xxiii, 114; xix, 172—solubility in benzol of commercial varieties, Heeren. xxv, 152; in eucalyptus oil, Osborne. xxvii, 234—solut. for elastic fabrics, etc. xxii, 85; for internal use, Varick. xxii, 86—clear solution, Eder and Toth. xxix, 75; xxx, 88—tubing preserved (under water), Mareck. xxix, 58; hard restored (glyc.), xix, 166—not affected by hot water (use bi-chrom. pot.). xxi, 139—fr. *BORNEO*, cont. borne-site, Girard. xx, 249; fr. *Upper BURMAH*. xxii, 112; fr. *Chavannesia esculenta*, Burmah. xxvii, 269; *CHAM*, fr. *Manihot Glaziovii* xxvii, 273; *DURANGO* (fr. a *Synanthera*), Mexico. xxiv, 768; *FIJI*, fr. *Alstonia plumosa* and a *Tabernaemontana*. xxvii, 269; *GABOON*, contains dambonite, Girard. xxii, 249; *MADAGASCAR*, contains mitezite, Girard. xxii, 249; *MEXICO*, fr. a *Castilloa*. xxiv, 768; *NICARAGUA*. xxi, 260; *PARA*, collection, Cross. xxvii, 269.

— fr. *ASCLEPIAS CORNUTI*, Canada. xxiii, 157.

— **ARTIFICIAL** (tungstic ac., glue), Sonnenschein. xix, 219.

Cape of Good Hope, Centennial exhibit., drugs. xxiv, 738.

Capicati, Arg. Republ. xxiv, 764.

Capivi, see *COPAIVA*. xxv, 214.

Capoor cutchery, China. xxiv, 750.

Capparidaceae. xxii, 134; xxv, 194; Kansas. xxix, 441.

Capparis BREVISPIA, India. xxvi, 160.

— **HERBACEA**, analysis of seed, Hirschsohn. xxii, 134.

— **SPINOSA**, rootbark used in India. xxvi, 165.

Caprifoliaceae. xix, 277; xxiv, 153; xxvi, 241; xxvii, 192; xxviii, 158; xxix, 166; xxx, 207; of California. xix, 302; Kansas. xxix, 441; Mexico. xxiv, 775.

Capryl ALCOHOL, see **ALCOHOL, CAPRYLIC**.

— **COMPOUNDS** (see base). xviii, 249.

Caps, METALLIC, are chiefly lead (up to 95 p. c.), Wittstein. xxii, 48.

Capsaicin, Thresh. xxv, 31, 317; xxvi, 618.

Capsella BURSA PASTORIS, California. xix, 299—in Ohio. xxviii, 503; Kansas. xxix, 443.

Capsicine, Felletar. xviii, 267.

Capsicol, Buchheim. xxii, 106—contains capsaicin, Thresh. xxv, 317, 318.

Capsicum ANNUUM, acidity due to capsicol, Buchheim. xxii, 34—adult. of powder. xxx, 576; xxviii, 122; (red lead, vermillion, brick-dust, horse-radish, etc.). xxi, 486; xxiii, 499; xxiv, 404; mineral adult., detect. by chlorof., Siebold. xxviii, 278—alkaloid analogous to conia. xix, 289—detect. in beer, Drugendorff. xxx, 340—with rum in fevers, Greece. xxvi, 582.

— **FASTIGIATUM**, seeds devoid of pungency, acrid principle not an alkaloid, Thresh. xxiv, 133.

— **HUNGARICUM**, (very mild flavor). xxix, 139.

— **Natal** (not pungent). xxix, 139.

Capsulae AMYLACRAE, see **WAFER CAPSULES**.

Capsules DEVORATIVES. xxiv, 31; Dieterich. xxiv, 96.

— **GELATIN**, Planten's. xxiv, 804—elastic, Detenhoff. xxvi, 127; xxvii, 102.

— **PORCELAIN**, may often be replaced by crockery ware, Christel. xxvi, 70.

— **WAFER**, see **WAFER CAPSULES**.

Capulin=*Cerasus capollin*, Mexico. xxiv, 776.

Caramel, detect. in beer (tannin), Schuster. xxii, 227—removed by albumen, Carles. xxiv, 286.

Caranna fr. *Amyris caranna*, Mexico. xxiv, 268—behavior to reagents, Hirschsohn. xxvi, 453-9.

Carao, Arg. Republ. xxiv, 764.

Caraway, adult of powd. xxx, 576—cultivat. in Canada, Saunders. xviii, 186—in Lincolnshire, Holmes. xxx, 209—uses in Greece. xxv, 170.

— **WILD**=*Cacalia atriplifolia*, Kansas. xxix, 442.

Carbasus ANTISEPTICUS. xxvii, 674.

Carbazol, fr. anthracene, Græbe and Glaser. xxi, 386.

Carbinols (**DIETHYL**—; **METHYLISOPROPYL**—; **METHYLPROPYL**—; **ETHYLDIMETHYL**—) xxvii, 412, 3.

Carbocen, fr. American petrol., Tweddle, Prunier. xxvii, 377.

Carbo-hydrates, estimat. in infants' food, Gerber. xxix, 306—combinat. with alkalis, Pfeiffer and Tollens. xxx, 366.

Carbon. xviii, 225; xix, 181; xxi, 283; xxii, 184; xxiii, 260; xxiv, 227; xxv, 250; xxvi, 363; xxvii, 316; xxviii, 230; xxix, 253; xxx, 282.

— **CRYSTALLIZED**, Mactear (a silicate compd). xxviii, 230. See **DIAMOND, ARTIFICIAL**.

— **POINTS**, prep., effects of salts, Carré. xxvi, 153.

— **SONOROUS** (charcoal, bisulph. carb.), Sidot. xix, 181.

— fr. sugar (great hardness) Monier. xxiii, 260.

— **BICHLORIDE**, act. of anhydrous sulph. ac., Schuetzenberger. xix, 183.

— **BISULPHIDE**, act. of potassa, Edison. xxvi, 366—

— as antidote to opium and morphia, Smith. xviii, 292—as disinfectant (in a lamp), Koenig. xxvi, 367—deodorized (corr. sublimate), Cloez.

xviii, 226; (lead; nitr. lead), Kern. xxiv, 229; (mercury), Sidot. xix, 182; (copper-turnings), Yvon. xxiii, 262; (permang. pot.), Allary. xxx,

284; (anhydr. sulph. copper), Palmieri. xxx, 284—value as insecticide, Schnetzler. xxv, 251

— manufacture, Deiss. xxviii, 231; Sidot. xix, 182; in France, xviii, 225—and nitric oxide

flame, Delachanal and Mermier. xxiii, 113—for extract. fixed oils, works of Heyl & Co., Ger-

many. xxiv, 793—as preservative, Ziller. xxv, 251—purification, see deodorization—chemically

pure (palm oil, nitric ac.), Friedburg. xxiv, 229—solid (agar-agar), Lefaurie. xxix, 253; (fixed

oil, protochlor. sulph.). Mercier. xxvi, 366; (strong current of dry air), Wartha. xviii, 226;

xix, 184—for generating sulphurous acid (in an ordinary lamp), Keates. xxv, 250—act. of sun-

light (formic ac.). Loew. xix, 183—opalescent alcohol test, Hager. xxx, 319—yield, Sidot. xviii,

226.

— **CHLORIDE** and **ALCOHOL** compd. xxi, 286.

— **MONOSULPHIDE** (bisulph., iron wire), Kern. xxiv, 229—prop., Sidot. xxiv, 228.

— **OXIDE**, fr. oxalic ac., Chevrier. xix, 181—liquefied, Cailletet. xxvi, 339.

— **OXYCHLORIDE**, Paterno. xxvii, 317.

— **PENTASULPHIDE** (sodium, bisulph.), Raab. xix, 184.

— **PROTO-HYDRIODIDE** (of Serullas) is chlorof. and iodine, Gautier. xix, 252.

— **SESQUICHLORIDE**. xxvi, 474.

— **SILICIUM**, Schützenberger and Colson. xxx, 281.

— **TETRABROMIDE**, Bolas [and Grove. xix, 183; Damoiseau. xxix, 296.

— **TETRACHLORIDE**, Damoiseau. xxix, 295.

Carbonado = black diamonds, Brazil. xxii, 184.

Carbonates, estimat. of carbon. ac., Noel. xxvi, 376.

Carbopetrocen, fr. Am. petrol., Tweddle; Prunier. xxvii, 377.

Cardamine ANGULATA, California. xix, 299.

— **RHOMBOIDEA**, Kansas. xxix, 443.

Cardamoms, account, India. xxiv, 726—act. of sulph. ac. and alcohol, Doliber. xix, 444—adult.

(orange seed; raw coffee), xxi, 478; mineral adult. of powd. detect. by chlorof. xxviii, 278—

drug market. xix, 399; xx, 128; xxii, 641; xxvi, 661; xxvii, 560; xxviii, 369; xxix, 371;

xxx, 465.

- Cardillo DE LA SIERRA**, Arg. Republ. xxiv, 761.
Cardinal FLOWER = *Lobelia cardinalis*, Kansas xxix, 447.
Cardiospermum HALICACABUM in India. xxvi, 166—in Mauritius. xxiv, 741.
Cardo Santo, Arg. Republ. xxiv, 762, 764.
Cardobenedict, detect. in beer, Dragendorff. xxx, 340—loss in drying. xxi, 202.
Cardol, poisonous relat. to cantharidin, Basiner. xxx, 328—irritating act., Brigham. xxx, 329—medicinal effects, Buchheim. xxii, 156—as vesicant, Maisch. xxix, 222.
Carex ARENARIA, as subst. for sarsaparilla, Radius. xxviii, 108.
 — **CAPILLARIS** (as adult. of saffron). xxviii, 112.
Careya ARBOREA, India, account, Dymock. xxvii, 236.
Car-hua-car-hua, a false cinchona bark, Brazil. xxvii, 190.
Carica PAPAYA, account, Oliver. xxviii, 174—act. of juice upon meat, Roy. xxiii, 205—active principle, Wurtz and Bouchat. xxviii, 175—acts energetically upon protein subst., without acid, Wittmack. xxvii, 231—vermifuge. xxiii, 119.
 — see also **PAPAYA**.
Carnallite, Stassfurt. xxii, 186.
Carnauba tree, Brazil, uses, Morgan. xxii, 122—root, descript. xxiii, 129.
 — see **CORYPHA CERIFERA** and **WAX, CARNAUBA**.
Carney, Chas. T. portrait. xxv.
Carob-assu—*Jacaranda subrhombica*, Brazil. xxx, 177.
Caroba, Brazil—*Jacaranda procera*. xxiii, 120—account, Alt. xxviii, 131—synonyms. xxx, 177.
 — **BRANCA**—*Sparattosperma lithontripticum*. xxx, 177.
 — **DO CAMPO**—*Bignonia nodosa*. xxx, 177.
 — **MINDA**;—**C. MIRUM**;—**C. CAROBINHA**—*Jacaranda procera*. xxx, 176.
 — **GUYRA**—*Bignonia purgans*. xxx, 177.
 — **PAULISTANA**, descript. xxiii, 156.
 — **DAS PAULISTAS**—*Jacaranda oxyphylla*. xxx, 177.
 — **PRETA**—*Jacaranda subrhombica*. xxx, 177.
Carobada MUIDA, descript., Holmes. xxiii, 156.
Carobin, prep., prop., Peckolt. xxx, 176.
Carobinha, descript., Holmes. xxiii, 156.
Carobone, Peckolt. xxx, 177.
Caroo velei—a spec. of acacia, India. xxiv, 718.
Carpen, f. podocarpinic ac., oudemans, fr. xxii, 254.
Carpenter, W. B., Address at Niagara meeting. xxx, 638.
Carpet weed—*Mollugo verticillata*, Kansas. xxix, 441.
Carqueja, Arg. Republ. xxiv, 762, 3, 4.
Carrageen, see **IRISH MOSS**.
Carrion flower, TALL—*Smilax peduncularis*. xxix, 451.
Carthamus TINCTORIUS, India. xxiv, 722.
 — see also **SAFFLOWER**.
Carum GAIRDNERI, California. xxvii, 192.
 — **KELLOGGII**, California. xix, 302.
Carvacrol for toothache, Jahns. xxviii, 265.
Carya ALBA;—**C. AMARA**;—**C. OLIVAEFORMIS**;—**C. SULCATA**, Kansas. xxix, 446.
 — **TOMENTOSA**, chem. examin., Smith. xxvii, 261.
Caryin fr. *Carya tomentosa*, Smith. xxvii, 261.
Caryophyllaceae, California. xix, 299—Kansas. xxix, 441.
Casca BARK (—Sassy). xxvi, 661.
 — **D'ANTA**—*Drimys granatensis*, Brazil. xxiii, 120.
Cascalote—*Caesalpinia cacalaca*, Mexico. xxiv, 776.
Cascara SAGRADA—*Rhamnus Purshiana*, California. xxvi, 698; xxvii, 607; xxviii, 369. See also **RHAMNUS PURSHIANA**.
Cascarilla, adult. (bark of *Croton lucidum*), Holmes. xxii, 307—yield of vol. oil, Osse. xxiv, 276.
 — **MAGNIFOLIA**, spec. gr. xxx, 201.
 — **NARANJADA**, Bolivia (flat cinchona). xxvii, 189.
 — **DE CARACOL DE PERSIA**, Tetlow, analysis, Risser. xxiv, 419.
Cascarilline prep. (oxalic ac.), Allesandri. xxx, 436.
Casein (milk) convert. into albumen by oil mustard, Schwalbe. xxiii, 234.
Caspari, Jr., Charles, Pyrophosphate iron. xxviii, 460.
Cassareep—*Janipha Manihot*, British Guiana. xxiv, 738.
Cassava starch, commercial, is fr. *Manihot utilisima*, Greeni-h. xxv, 130—cult. in Florida. xxx, 374—as source of glucose, yield. xxx, 374.
Cassebeer, Hy. A. xxv, 517.
Cassia BUDS, drug market. xix, 396; xxii, 625.
 — (cinnamon), drug market. xxii, 625; xxvii, 558, 560—distinction fr. Ceylon cinnamon, (tinct. iodine to decoct.), Woodland. xxx, 154—(amount of manganese in ash), Helmer. xxviii, 117.
 — **ALATA**, descript. and uses, India, Dymock. xxv, 211—in ring-worm, Ceylon. xxvii, 474.
 — **AURICULATA**, India, descript. and uses, Dymock. xxv, 211; xxiv, 716.
 — **BREVIPEDES**, **CHAMÆCHRISTA** (false senna), descript., Holmes. xxiii, 211—Kansas. xxix, 447.
 — **EMARGINATA**, Jamaica. xxiv, 736.
 — **LENITIVA**, microscop. struct. of leaf, Lenz. xxx, 238.
 — **LIGNEA**, China. xxiv, 746—India. xxvi, 163.
 — **MARYLANDICA**, Kansas. xxix, 447.
 — **OBOVATA**, Jamaica. xxiv, 734.
 — **OCCIDENTALIS** (negro coffee), analysis, cont. achrosin, Closset. xxiv, 190—microscop. descript., analysis of seed, Möller. xxix, 209, 210—uses in Brazil. xxvi, 169—in ring-worm, Ceylon. xxvii, 474—uses in India, Dymock. xxvi, 166—uses in Liberia, Holmes. xxvi, 163.
 — **RUMPHIANA**, Mauritius. xxiv, 741.
 — **SOPHORA** in ring-worm, Ceylon. xxvii, 474—in China. xxiv, 745—in India, Dymock. xxvi, 166.
 — **TORA** in ring-worm, Ceylon. xxvii, 474—in China. xxiv, 751—descript and uses in India, Dymock. xxv, 211—uses in Japan. xxviii, 100, 186.
Cassie FLOWERS (*Acacia Farnesiana*) in Australia. xxviii, 100—France. xxvii, 383.
Cassiteritis, California. xxvii, 597.
Cassy(l)tha FILIFORMIS, descript. and uses, India, Dymock. xxv, 145—Mauritius. xxiv, 741.
Cassumunar root—*Curcuma Zedoaria*, descript. and uses, India, Dymock. xxviii, 114.
Castanea VESCA. see **CHESTNUT**.
Castanospermum AUSTRALIS, Australia. xxv, 130.
Castilleja ELASTICA, yields caoutchouc. xviii, 285.
Castor beans, collect., Calif. xxiii, 222.
Castoreum, abnormal (47 p. c. carb. calc.), Rudolf and Godeffroy. xxvii, 288; Janota. xxviii, 210—history, Hager. xxvii, 289—drug market. xxv, 338; xxviii, 370; xxix, 371; xxx, 465.
Cat tails—*Typha latifolia*, Kansas. xxix, 451.
Catalpa, Bunge, uses in China. xxv, 234.
Catha EDULIS, effects like coca, Arabia, Jackson. xxii, 156—cont. no alkaloid, Flückiger. xix, 270.
Cataplasma, see **POULTICE**.
Catechin fr. *Uncaria*, Gambier, Gautier. xxvi, 558—Etti. xxvi, 557—in mahogany, Latour and Cazeneuve. xxiv, 175.
 — **RED**, Etti. xxvi, 557.
Catechu, adult., Tissandier. xix, 272—cont. quercetin, Löwe. xxii, 276—Jamaica. xxiv, 736—drug market. xix, 403; xxvii, 560.
Catgut—*Tephrosia virginica*, Kansas. xxix, 447.
 — for **LIGATURE**, Lister (chromic, carbol. ac., oil). xxix, 110—Kocher (oil junip.). xxx, 129.
Caucho, India rubber tree, Cross. xxiv, 202.
Caula EDULIS, Africa, descript. of seeds, Moeller. xxix, 116.
Caulophyllin (eclectic), solubility, Parker. xxx, 128.
Caustics (Cauteries; Escharotics). xxii, 56; xxv, 70; xxvii, 75; xxviii, 48.
 — **ARSENICAL**, Ratier. xxiii, 54—**BLACK**, Velpeau. xxiii, 54—**CANQUOINS**, Carlos. xxvi, 95—**CANTHARIDES**, Ebert. xxiii, 55—**IODINE**, Rieseberg. xxii, 56; xxiii, 55—**LIQUID**, Piazza. xxx, 91—**LUNAR**, see **SILVER**, **NITRATE**—Strauss (butter antimony, nitr. silver). xxi, 154.
 — **PENCILS**, Calmberg (sulph. copper and borax). xxiv, 71; Schrull (sulph. copper, melted dry and rolled out). xxiv, 71; Steffens. xxiii, 54; Heller (nitr. silver in wood). xxviii, 48; Sawosticki (nitr. silver, toughened with lead). xxviii,

Caustics (Continued).

- 48—zinc, Eb. rt. xxiii, 55; xxiv, 71—see also PENCILS.
- Cay baong** = *Citrus fusca*, Cochin China. xxviii, 169.
- Cayuchiza**, Arg. Republ. xxiv, 765.
- Ccancolla**; — *CCOSCOSSA*; — *CCOYLA* = Quinoa, South America. xxi, 213.
- Ceanothus AMERICANUS**, Kansas. xxix, 450.
- *DIVARICATUS*; — *C. INTEGERRIMUS*, California. xix, 30.—*C. OVALIS*, Kansas. xxix, 450.—*C. THYRSIFLORUS*, California. xix, 300.
- Cebadilla** = *Veratrum frigidum*, Mexico. xxiv, 770.
- Cebil**, Arg. Republ. xxiv, 764.
- Cedar. RED** = *Juniperus virginiana*, Kansas. xxix, 443.
- **WHITE** = *Libocedron decurrens*, California. xxvii, 600;—of Cayenne = Linaloes. xxx, 324.
- Ceder, EUROPÆISCHE** = *Larix europaea*. xxv, 321.
- Cedrela ODORATA**, uses in China. xxv, 234.
- Cedrelaceae**. xxvi, 269.
- Cedrin**, fr. *Simaba cedron*, Tanret. xxix, 194.
- Cedron** = *Verbena officinalis*, Arg. Republ. xxiv, 762;—*Lippia lcioides*, Chili. xxiv, 766;—*Lippia citriodora*, Mexico. xxiv, 772;—*Simaba cedron*, South America. xxvi, 699.
- **DE PUNA**, Arg. Republ. xxv, 763.
- Cedronella MEXICANA**, Mexico. xxiv, 772.
- Chelidonium MAJUS**, young leaves cont. ferment., Kosmann. xxv, 330.
- Celastraceae**. xix, 270; xxii, 156; xxv, 220; xxvi, 298; xxvii, 265; xxx, 248; of Kansas. xxix, 441.
- Celastrus OBSCURUS**, Abyssinia, descript. and analysis of leaves, Dragendorff. xxvi, 298.
- **PANICULATA**, descript. and uses of oil, India, Dymock. xxv, 220.
- **SCANDENS**, constituents, Bernhard. xxx, 248—Kansas. xxix, 441.
- Celery seed**, adult. of powd. xxx, 576.
- **WILD** = *Apium graveolens*, India. xxvii, 192.
- Cellar and STORE ROOM** of a pharmacy, Hancock. xxvi, 703.
- Celluloid**, manuf. xxvi, 156.
- Cellulose**, act. of anhydr. acet. ac., Schützenberger. xix, 261—constitution, Franchimont. xxviii, 295; Schützenberger. xviii, 270—decomp. by salts and by distilled water. xxviii, 295.
- **NITRO-COMPOUNDS** (di—; tri—; tetra—; penta) Wolfram. xxvii, 437; Eder. xxviii, 296.
- **ANIMAL** (tunicin) constitution, Franchimont. xxviii, 294.
- **DINITRATE**, Eder. xxviii, 296.
- of **FUNGI**, behavior to chem. reagents (differs from phænogamic cellulose), Masing. xix, 260; denied by Richter. xxx, 366.
- **FRIABLE**, see **HYDROCELLULOSE**.
- **HEXANITRATE**; — **PENTA**—; **TETRA**—; **TRI**—; Eder. xxviii, 296, 7.
- Celmisia CORIACEA**, New Zealand. xxiv, 737.
- Celosia ARGENTEA**, China. xxiv, 750.
- Celsus**. xxvi, 843.
- Celtis OCCIDENTALIS**, Kansas. xxix, 452—**TATA**, Arg. Republ. xxx, 138.
- Cembrot**—*Pinus cembra*, France. xxvi, 322.
- Cements**. xxi, 197.
- **Aquaria**. xxv, 116; xxix, 58—for bottles, xxvii, 63—caoutchouc to wood or metal. xix, 172; xxiii, 114; xxix, 58—corks. xxi, 197—cracked glassvessels. xxi, 196—glass, Schwarz. xxiv, 113—gutta percha to silk and leather. xix, 172, 173—iron. xxvii, 62—kerosene lamps. xxvii, 62—knife handles. xix, 172—leather. xxix, 59—marble. xxiii, 114—metal to glass, Franke. xxii, 53—paper, pasteboard, etc., Daun. xxix, 59—wood, pasteboard, porcelain, etc. xix, 172—pestles, Fairthorne. xxx, 57—porcelain, glass, Liesegang. xxi, 196; Boettger. xxvi, 157.
- **casein**. xxv, 116—colored, Boettger. xix, 173—glycerin. xix, 171; xxviii, 40—liquid. xix, 172, 175—magnesia. xviii, 213.
- see also **PASTE** and **MUCILAGE**.
- Centaurea BEHEN**, uses in India, Dymock. xxvi, 160.
- **CYANUS**, seeds in Lithuanian linseed, Holmes. xxx, 215.
- **MELITENSIS**; — **C. SOLSTITIALIS**, California. xix, 303.
- Centaury**, detect. in beer, Dragendorff. xxx, 340—loss in drying. xxi, 202.
- Centrifugal DRYER**, Mohr. xxv, 53.
- Centipeda** = *Myriogynes spec.*, Australia. xxvii, 283.
- Centrolobium ROBUSTUM**; — **C. TOMENTOSUM**, Brazil—*araroba*. xxiii, 215.
- Cepa CABALLO**, Arg. Republ. xxiv, 762, 4;—*Xanthium spinosum*, Chili. xxiv, 765.
- **DE COLA** = Cola nuts, Venezuela. xxvi, 253.
- Cephalanthus OCCIDENTALIS**, Kansas. xxix, 450—constituents, Hattan. xxiii, 176.
- Ceradia, RESIN**, behav. to reagents, Hirschsohn. xxvi, 453-9.
- Cerasus BIGLANDULOSA**, California. xix, 301.
- **CAPOLLIN**, Mexico. xxiv, 776—**C. DEMISSA**, California. xxvii, 240—**C. ILICIFOLIA**, California. xix, 301; xxvii, 240—**C. VIRGINIANA**, California. xix, 301.
- Cerates**, use yellow wax, Markoe. xxi, 515—lard subst. by expressed oil mustard, Rother. xxiv, 65—work cold, Wilder. xxiv, 66.
- **CANTHARIDES**, diff. act. of fine (mild) and coarse powd. (blister), Neynaber. xxv, 61. See also **PLASTER**.
- **CARBOLIC**, Boehme. xix, 152.
- **CHLORAL** xxv, 665.
- **LEAD ACETATE** (to subst. cerate subacet. lead), Moore. xxvii, 67.
- **PARAFFIN**, Lemberger, Miller. xxiii, 47.
- **RESIN**, with expressed oil mustard, Rother. xxiv, 65—melt ingredients successively, Hogan. xxv, 63.
- **RESIN, COMPOUND**, Moore (lard for linseed oil). xxx, 65—Sheppard (paraffin oil for linseed oil). xxvi, 768.
- **SPERMACE** (with ceresin), Samphir. xxi, 155.
- Ceratophyllaceae**, Kansas. xxix, 441.
- Ceratophyllum DEMERSUM**, Kansas. xxix, 441.
- Cerbera THEVETIA**—*Thevetia nerifolia*, descript. and uses in India, Dymock. xxvi, 163.
- Cercis CANADENSIS**, Kansas. xxix, 447—**C. OCCIDENTALIS**, California. xix, 301.
- Cerebrin**, comp., Geoghegan. xxviii, 365.
- Cereoli NASALES**. xxviii, 71.
- Ceresin**,—paraffin and carnauba wax, Buchner. xxvii, 435—in ointments, Samphir. xxi, 155—fr. ozokerite. xxi, 319—sp. gr., Hager. xxvii, 424; Dieterich. xxx, 363—detect. in bees wax (pot., alcohol), Buchner. xxvii, 435; (float in alcohol), Wagner. xxvii, 435.
- Ceria**, equivalent and spectrum, Delafontaine. xxvii, 343.
- Cerium**. xxv, 255; xxvii, 340; xxix, 261.
- freed fr. lanthan and didym, Erk. xxv, 256—prop., Hillebrand and Norton. xxv, 255—fluorescence of salts, Soret. xxvii, 346—act. of trimethylamin, Viucent. xxv, 315.
- **OXALATE**, impur. of commercial, Greenish. xxv, 256—presence of didym, Chastaing. xxix, 261—pill excipient (manna), Fairthorne. xxx, 101.
- **TUNGSTOBORATE**, Klein. xxx, 302.
- Ceroon** (cinchona). xxvii, 826.
- Ceroso-ceric OXIDE**, Sonnenschein. xix, 227.
- Cestrum PARQUI**, Chili. xxiv, 765—**C. PSEUDOGUINA**, Arg. Republ. xxx, 138.
- Cetaceum**, see **SPERMACE**.
- Cetraria ISLANDICA**, cont. an iodine blueing subst. Berg. xxi, 205.
- see also **ICELAND MOSS**.
- **ISLANDICA SACCHARATA**, Dutch Phar. Soc. xxx, 68.
- Cetylid** (fr. cerebrin), comp., Geoghegan. xxviii, 365.
- Cevadia** (=veratria, of Merck), fr. cevadilla, Wright and Luff. xxvi, 595.
- Cevadillia**, Wright and Luff. xxvi, 595.
- Cevina**, Wright and Luff. xxvi, 595.
- Ceylon moss**—*Gracilaria lichenoides*. xxiv, 725.
- Ceynodon DACTYLON**, Mauritius. xxiv, 741.
- Chachacoma**, Arg. Republ. xxiv, 763.
- Chackamaque resin**, Madagascar, descript., prop., Hanausck. xxvi, 257.
- Chai resin**—*Shorea rubrifolia*, Cochin China, Hanausck. xxvi, 256.
- Chalba** (chalwa) = *Sesamum gruel*, Orient. xxx, 178.

- Chalk** (ENGLISH) comp., Vogel. xxii, 193.
 — FRENCH, see TALCUM.
 — WASHOE, (diatomaceous earth). xxvii, 588.
Chalkanthemum = *Chrysanthemum segetum*, Greece. xxv, 157.
Chamaeliretin, prep., prop., Greene. xxvii, 529.
Chamaelirin, Greene. xxvi, 189; xxvii, 528.
Chamaelirium LUTEUM, analysis, Greene. xxvi, 189.
Chamaileon = *Atractylis gummifera*, Greece. xxiv, 141.
 "Chamber CRYSTALS," constitution, (nitro sulph. ac.), Michaelis and Schumann. xxii, 242—as disinfectant, Girard. xxix, 244.
Chamberlain's RELIEF, analysis, Pierron. xxiv, 420.
Chamico = *Stramonium*, Arg. Republ. xxiv, 762; Chili. xxiv, 761.
Champa = *Michelia champaca*. xxv, 174.
Chamaebatea FOLIOLOBA, California. xix, 301.
Chamomile, drug market. xix, 402; xx, 122; xxiv, 396; xxv, 348; xxvi, 655; xxvii, 558, 560; xxviii, 372; xxix, 372; xxx, 465—in Greece. xxiii, 165.
 — GERMAN, loss in drying. xxi, 202.
 — ROMAN, cult. in Mitcham. xxiii, 165—test for sulphur, Wittstein. xix, 285—see also ANTHRIS NOBILIS.
Chamomilen, Demarçan. xxii, 221.
Chañar = *Gourliea decorticans*, Arg. Republ. xxiv, 763; xxx, 138.
Chancle = *Bletia campanulata*, Mexico. xxiv, 769.
Chandra = *Ophioxylon serpentinum*, descript. and uses in India, Dymock. xxviii, 141.
Chapman, W. B., Portrait. xxvii.
Chapped hands, liniment, Close. xix, 488.
Chaquihue = *Crinodendron Hookerianum*, Chili. xxiv, 765.
Characin, odorous principle in algæ, Phipson. xxviii, 268.
Charak = stem of pepper-plant, India. xxviii, 192.
Charbak Abgadh = *Veratrum album*, Arabia. xxvi, 592.
Charcoal, absorbs antimony and arsenic fr. acid solutions, Skey. xxvi, 364—chemically pure has no decolorizing act., Melsens. xxiv, 228—for forming mur. ac. with chlorine. xxi, 283.
 — ALBUMINATED. xxvii, 317.
 — ANIMAL, theory of decolorization, Wernekinck. xxi, 281—estimat. of decoloriz. power, Schober (indigo carmin). xxi, 285—manuf., France. xxiv, 227—ought not to be freed fr. phosph. calc., Collas. xxi, 284—purified (yield: 20 p. c.) Græger. xxi, 283—as reducing agent at low temperatures, Heintz. xxvi, 363.
 — ANIMAL, ARTIFICIAL (charc., ol. animal. feet., and char), Facilides. xix, 181—(wood impregn. with phosph. calc., and char), Melsens. xxiii, 262.
 — WOOD, cont. acet. potash, Jaillard. xxv, 250—made in retorts is better, Reichenbach. xxiii, 261—prop., Hargreaves. xxiii, 260.
 — HOLDER, Casamajor. xxiv, 59.
Charta, see also PAPER.
 — ARSENICAL COMP., Phil. Hosp. xxiv, 67.
 — SINAPIS, subst. caoutchouc in benzine, Ger-rard. xxiii, 47.
 — VERNICKA. xxiii, 48.
Cha-sin-kiow = rice wine, China. xxii, 33.
Chaulmoogra = *Hydnocarpus odoratus*, India. xxiv, 725.
 — see also GYNOCARDIA.
Chau-to-ko = *Uncaria gambir*, Japan. xxviii, 157.
Chavannesia ESCULENTA, Burmah, source of caoutchouc. xxvii, 269.
Chavica SIRIBOA has silicified cells. xxx, 248.
Chavicin fr. black pepper, Buchheim. xxv, 320.
Chay root = *Hedyotis umbellata*, India. xxiv, 716.
Chechinkamyne, OYLE (1610). xix, 492.
Chekan, (Cheken) = *Myrtus cheken*, Chili. xxvii, 235.
Chelerythrin, history. xxi, 376.
Chelidonin, history. xxi, 376.
Chelidonium MAJUS, alkaloidal strength at diff. periods, Masing. xxiv, 182—use of root in consumption, Thiebaud. xxx, 233.
 "Chemical food" (Parrish), improved details, Saunders. xxv, 106.
Chemicals, adult., general remarks, Remington. xix, 319—action retarded by glycerin, Lange. xxvi, 497—list, received through N. Y. Custom House. xxi, 441.
 — at CENTENNIAL EXHIBITION: xxiv, 780—Austria. xxiv, 795—Belgium, 796—Brazil, 797—Denmark, 796—France, 787—Germany, 787—Great Britain, 784—India, 786—Italy, 796—Japan, 798—Mexico, 797—Russia, 800—Spain, 798—Sweden and Norway, 796—Switzerland, 796—Turkey, 800—United States, 780—home-made, Maisch. xxvi, 902; Mercein. xxii, 427; xxvi, 789—manufacture in United States. xxv, 339; Miller. xxiv, 533; poor reputation in Canada. xxv, 340.
 — on EXHIBITION: Atlanta. xxvi, 700—Baltimore. xviii, 301—Boston. xxiii, 532—Cleveland. xx, 170—Indianapolis. xxvii, 678—Kansas City. xxix, 398—Louisville. xxii, 323—Niagara. xxx, 502—Richmond. xxi, 462—Saratoga. xxviii, 375—St. Louis. xix, 378—Toronto. xxv, 378.
 — preservation (castor oil seal), Koenig. xxi, 154—solubility in alcohol, Candidus. xxx, 564, 621—solut. for dispensing, Sloan. xxix, 404.
Chemistry, INORGANIC. xviii, 215; xix, 176; xxi, 269; xxii, 173; xxiii, 237; xxiv, 207; xxv, 239; xxvi, 332; xxvii, 290; xxviii, 211; xxix, 239; xxx, 255.
 — ORGANIC, has been erected with a false atomic weight for carbon, Mohr. xxvii, 38.
 — ORGANIC. xvii, 243; xix, 200; xxi, 318; xxii, 208; xxiii, 317; xxiv, 268; xxv, 269; xxvi, 431; xxvii, 377; xxviii, 259; xxix, 283; xxx, 313.
Chenna. See LAWSONIA. xxix, 207.
Chenopodiaceæ. xxi, 213; xxii, 104; xxiii, 147; xxvi, 201; xxvii, 152; xxix, 136; xxx, 157; of California. xix, 305; Kansas. xxix, 441; Mexico. xxiv, 772.
Chenopodium ALBUM, seed in Dutch linseed, Holmes. xxx, 215—in Kansas. xxix, 441.
 — AMBROSIOIDES is not extracted by benzin, Remington. xxii, 536—microscop. exam. of leaf, Paschkis. xxx, 158—in Brazil. xxvii, 152—Kansas. xxix, 441—Mexico. xxiv, 772.
 — ANTHELMINTICUM, microscop. exam. of leaf and fruit, Paschkis. xxx, 157, 9—in Brazil. xxvii, 152—Kansas. xxix, 441.
 — BOTRYS, microscop. exam. of leaf, Paschkis. xxx, 159—in asthma, France. xxvii, 153—Kansas. xxix, 441.
 — GLAUCUM, seed in English linseed, Holmes. xxx, 215.
 — KOCHIA, China. xxiv, 759.
 — QUINOA, constit. of seed, Cooke. xxi, 213.
 — SUFFRUTICOSUM in Brazil. xxx, 159.
 — VULVARIA, microscop. exam. of leaf, Paschkis. xxx, 159.
Cherry, contains amygdalin in the leaves, Rochleder. xix, 257—juice, German, uses, Miller. xxi, 194—kernels, yield of amygdalin, Lehmann. xxiii, 437.
Cherry laurel, yield of amygdalin fr. leaves. xxiii, 437—leaves are rendered inactive by intense cold, Flickiger. xxviii, 178.
Chessalonga = *Eupatorium glutinosum*, Quito, as matico. xxiii, 222.
Cheanutt, OYLE (1610). xix, 492.
Chestnuts, eatable (=marrons) contain no dextrose; Ludwig. xviii, 276—leaves, analysis, Steltzer. xxviii, 198; Turner. xxviii, 197.
Chewstick = *Gouania Domingensis*. xxvii, 282.
Chia = *Salvia columbaria*, Arizona. xxvii, 163;—*Salvia hispanica*, descript. and therapeutic value, Flowers. xxx, 172.
 — AZUL = *Salvia patens*, Mexico. xxx, 174;—*Salvia polystachia*, Mexico. xxx, 174.
Chicken pepper = *Ranunculus abortivus*, Kansas. xxix, 450.
Chicle, fr. *Achras sapota*, Mexico. xxiv, 768.
Chicory, analysis of flowers, Nietzki. xxiv, 142—is used as a substit. but not as an adulterant of taraxacum, Royce. xxii, 551—detect. in coffee, (glucose react.), Vogel. xviii, 280—in California. xxvii, 624.
Chicozapote = *Achras sapota*, Mexico. xxiv, 774.
Chita = *Plumbago Zeylanica*, India. xxviii, 118.
Chi-ken = *Citrus fusca*, Cochin China. xxviii, 169.

- Chi-koh=Citrus fusca, China. xxviii, 169.
 Chilba dona=Trigonella scenum græcum, Turkestan. xxi, 256.
 Chilblains, wash. xxvii, 122.
 Chilca=Baccharis umbelliformis, Chili. xxiv, 765.
 Chilca dulce, Arg. Republ. xxiv, 762, 4.
 Chili, drugs, Centennial exhibit. xxiv, 765—pharmacopœia; pharmacy. xix, 315; Wheeler. xxiv, 445.
 Chili coyote=Cucurbita perennis, Arizona. xxvii, 229.
 Chimaphila UMBELLATA, constituents, Smith. xxx, 188.
 Chimborazo, etymology. xxvii, 816.
 China, drugs, Centennial exhibit. xxiv, 743—pharmacy, xxii, 31.
 China DU BRÉSIL=Esenbeckia febrifuga. xxiii, 190.
 — CUPREA contains quinine, Hesse. xxiii, 397. See also CINCHONA CUPREA.
 — PIAVI=Esenbeckia febrifuga, Brazil. xxiii, 190.
 — ROOT, two different drugs of that name. xxi, 501=Pachyma cocos, in London, Webb. xxi, 204, 8=Smilax glabra. xxi, 501=a fungus in China (pe-fa-lie). xxi, 501; xxiv, 746. See also SMILAX CHINA.
 Chinamina, see QUINAMINA.
 Chinan, Arabia. xxiv, 780.
 Chinetum, see QUINETUM.
 Chinchil, Arg. Republ. xxiv, 762.
 Chinchona vs CINCHONA, Markham; Hanbury. xxiii, 168.
 Ching muh hsiang=Aristolochia recurvilabra, China. xxi, 209.
 Chininum BIMURIATICO-BICARBAMIDATUM, Drygin. xxvii, 505.
 — BIMURIATICO-CARBAMIDATUM, Drygin. xxvii, 504.
 — BIMURIATICO-SEMI-CARBAMIDATUM, Drygin. xxvii, 505.
 — see also QUININE.
 Ch(Qu)inium=crude quinine of German market (about 60 p. c. quin. sulph.). Hager. xxviii, 326—crude alkaloids fr. unsalable bark, leaves, etc., Brœker. xxv, 306—analysis, Moens. xxv, 307.
 Chinoidin is principally diconchinin, Hesse. xxvi, 566; xxix, 333—purified, Dutch Phar. Soc., xxx, 416—best source of quinidia, Jobst. xxiv, 351; separat. fr. quinidia, De Vrij. xxi, 379—as purgative, Hager. xxviii, 331—therapeutic value, Bardel and Hager. xxviii, 331.
 — ANIMAL (= septicin), Dupré. xxiii, 436.
 — BORATE, Dutch Phar. Soc. xxx, 417—prep., Pavesi. xxviii, 332; (is a mechanical mixture, Jobst. xxviii, 332)—prep. (details), Vrij. xxix, 333.
 — CITRATE as substit. for quin. sulph., Jobst. xviii, 262.
 — IODO-SULPHATE, Vrij. xxiv, 349—as test for quinia, Vrij. xxix, 328; xxx, 408.
 — KINOATE, Dutch Phar. Soc. xxx, 417.
 — MURIATE, Dutch Phar. Soc. xxx, 417.
 — TANNATE, Reiher and Klamann xxx, 418.
 Chinolin and leucoline are not identical, Williams. xxx, 418—account. xxx, 472—quality of commercial, Ekin. xxx, 418—oxidation products, Hougewerff. xxviii, 331—physiolog. effect, Donath. xxix, 334; xxx, 419—synthesis (fr. acrolein-anilin), Königs. xxix, 334.
 — PARAOXYBENZOATE;—CH. SALICYLATE;—CH. TARTRATE, solubility in water, Donath. xxx, 420—therapeutic value, Loewy. xxx, 420.
 Chinon (quinon), prep. fr. anilin, Nietzski. xxvii, 524.
 —, BENZOL-, Fittig. xxii, 276.
 —, MESITYLENE-, Fittig. xxii, 276.
 —, TOLU-, Fittig. xxii, 276.
 Chinons, color reaction. Fittig. xxii, 275.
 Chinquapin, WATER-, = Nelumbium luteum, Kansas. xxix, 448.
 Chionanthus VIRGINICA, root-bark cont. saponin, Justice. xxiii, 150.
 Chipman, E. D., pil. ferri carbon., U. S., '70. xxi, 600—squills. xxiv, 526.
 Chir = wood of Pinus longifolia, India. xxviii, 198.
 Chirata-meetha = Ophelia angustifolia. xxiii, 500 See CHIRETTA.
 Chiratin (chiretin), Höhn. xviii, 278; xix, 287.
 Chiratogenin. xix, 287.
 Chiretta, constituents, Höhn. xviii, 278; xix, 287—substit. by Ophelia angustifolia, Bentley. xxiii, 163.
 — PUHAREE = Ophelia angustifolia. xxiii, 499.
 Chirettin, SACCHARO-, Kemp. xix, 158.
 Chironjee = Buchanania latifolia, India. xxiv, 719.
 Chirphul = Xanthoxylon triphyllum, India. xxv, 180.
 Chitrak = Plumbago Zeylanica, India. xxviii, 118.
 Chittira = Plumbago Zeylanica, India. xxviii, 118.
 Chi-xac = Citrus fusca, Cochin China. xxviii, 169.
 Chlora PERFOLIATA. xxviii, 135.
 Chloræthyl, CHLORIDE (di-; tri-; tetra-; hexa-). xxvi, 474.
 Chloræthyliden, Schering xix, 244—test for chloroform. xix, 245—prep. and prop., Hager. xix, 244—typical relations, Elsner. xix, 244.
 Chloral (HYDRATE), act. of various alcohols, Martius and Mendelsohn. xix, 247; of cyanate pot., sulphocy. pot., ferroc. pot., Wallach. xxiv, 291; of hydrocy. ac., Pinner and Bischoff. xxiv, 292; act. upon resins, gum resins, balsams, Hirschsohn. xxvi, 458; of sulph. hydrog., Kleinat. xxvi, 492—as anaesthetic, Liebreich. xviii, 255—antiseptic (for anatomical purposes), White. xxiii, 712; Keene. xxiii, 715; Baker. xxii, 710; Schering. xxi, 335—value as antidote to convulsive poisons, Husemann. xxviii, 280; to strychnia, and vice versa, Liebreich xviii, 256; to brucia, thebaia, codeia, calabarin, picrotoxin, Husemann. xxvii, 507; strychnia is not an absolute antidote, Oré. xxi, 335—and camphor, Brown. xxii, 232; a definite compound, Cazeneuve and Imbert. xxix, 297; a simple solution, Roberts. xxv, 457; more mechanical than chemical, Saunders. xxv, 277; (doubted by Squibb. xxv, 525;) is fluid. xxi, 446—dissolves cellulose, Edison. xxvi, 492—yield of chloroform, Rademaker. xxi, 147—contamin. with chloral alcoholate. xviii, 257, 342; chlorine and manganese. xxi, 489—constitution. xviii, 258—decomp. by glycerin (chlorof. and formic ac.), Byasson. xxi, 335; by permang. pot., potassa (carbon. oxide), Tanret. xxiii, 344—discussion. xviii, 117; xix, 89—large dose (15 grams). xxx, 345—drug market. xix, 401; xxi, 428; xxii, 625—volume equivalent, Wurtz. xxvi, 492—estimat. (amount of formic ac.), Meyer and Heffter. xxii, 230—fluid volume, Candidus. xxvii, 709—hypodermic sol., Powers. xxvii, 93—insoluble converted into ordinary by naphthalen, Hoffmann. xxiv, 292—yields no iodoform, Hager. xxx, 346—keeps well in abs. of moisture, Grabowsky. xxvi, 291—neutrality best determined in alcoh. sol., Hager. xxii, 231—PREPARATION and manufacture. xxii, 230; diff. steps in the formation, Biel. xxvi, 473; requires daylight, Kohlmann. xviii, 258; (anhydrous), Markoe. xviii, 123; accelerated by iodine, Springmühl. xix, 246; history, etc., Squibb. xviii, 117; (starch, mur. ac., manganese), Stædeler. xviii, 257; apparatus Kohlmann. xviii, 258—cause of its changes into metachloral, Byasson. xxix, 297—and morphia in delirium and mania, Kühn. xxi, 335—and oil peppermint, Jehn. xxii, 219, 232; xxiii, 326; color react. is due to mur. ac., Ommen. xxiv, 277; Dunnin. xxvi, 444; Frebault. xxiii, 344—physiolog. act., Liebreich and Personne. xviii, 258; is not due to alkalinity of blood, Power. xxix, 297; not chloroform, but carbon. oxide is formed, Tanret. xxvii, 410—prop., Fairthorne. xxi, 146—pure, fr. bisulph. carb., Maisch. xix, 89, 91; Flückiger. xix, 245—TESTS for purity, Belohoubek. xxviii, 280; Riekher. xviii, 256; Roberts. xxiii, 707; Squibb. xix, 543—Squibb's better than the German, Ebert. xix, 91—all samples possess an acid reaction fr. formic ac., Bernbeck. xxi, 334; objected to in behalf of Brückner & Lampe by Liebreich. xxi, 334; "vapor reaction" of no value as test, Maisch. xxi, 657; xxii, 231—reduces gold and platinum. xx, 26—Saame and Co's manufacture. xxiv, 791—

Chloral (Continued).

- as sedative, Liebreich. xviii, 256—solubility in fixed oils, Jehn. xxiii, 343—solution diff. to keep, Markoe. xix, 89—solvent power for alkaloids, Fairthorne. xxiii, 344—forms a compd. with sulph. ac., Grabowski. xxi, 334—test for alcoholate (sulphomolybd. ac.), Boettger. xxviii, 274; (iodof. test), Hager. xviii, 257; (nitr. ac.), xix, 343; (amount of chlorot.), Umney, xix, 246—test for mur. ac., Anderson. xxv, 276—for phenol, Guareschi. xxii, 238—add. of water at once is clear; little by little is turbid, Diehl. xxi, 89—yield, Squibb. xviii, 124; Thomson. xviii, 258.
- Chloral ALCOHOLATE**, test, Mason. xix, 247; Umney xix, 246; Hager. xix, 247.
- CREAM**. xxv, 93.
- CYANHYDRIDE**, Pinner and Bischoff. xxiv, 292.
- DRAUGHT** as hypnotic, Liebreich. xviii, 256.
- GLYCERITES**, Fairthorne. xxiii, 67.
- SULPHHYDRATE**. xxi, 336.
- Chloralid**, act. of zinc and mur. a., Wallach. xxiv, 292—constitution, Personne. xxiii, 345—prep. and prop., Grabowsky. xxiv, 291.
- Chloralum**, analysis, Müller. xxii, 320.
- Chloranthus INCONSPICUUS** for scenting tea, China. xxiv, 744.
- Chlorates**, powd. in large quantities (hot sat. sol. on glass plates) Gawalowski. xxii, 179—prep. (fr. chloral calc.), Pichinay. xxx, 272—in hot solut., Lunge. xxix, 248.
- Chlorea VULPINA**, (as source of chrysophan. ac.). xxv, 65.
- Chlorhydrinimid**, Claus. xxii, 241.
- Chlorine**. xviii, 219; xix, 184; xxi, 275; xxii, 177; xxiii, 243; xxiv, 215; xxv, 242; xxvi, 352; xxvii, 304; xxviii, 218; xxix, 245; xxx, 270.
- bleaching effect due to ozone, Boillot. xxiii, 238; removed by bisulphite sodium. xxii, 189—condensator, Kern. xxiii, 31—constitution, Goepner and Schipp. xxiv, 216—probably a compound, Meyer. xxviii, 218—estimat. (ferroc. pot.), Bong. xxiv, 215; xxvi, 368; in pres. of iodine and brom. (nitr. silv.), Field and Huschke. xviii, 221; (peroxide lead) Vortmann. xxix, 245; infl. of var. salts in estim. by nitr. silv. and bichrom. pot., Pellet. xxvi, 352—generator. xxviii, 220; Kæmmerer. xxv, 54; Mermet. xxiii, 31—freed fr. mur. ac. (by sulph. copper) Stolba. xxiii, 243—preparation, (mur. ac., oxide iron) xxi, 275; (mur. ac., bichrom. pot., sulph. ac.), xxiv, 215; (fr. chloride magnes. waste) Townsend. xxix, 245; (fr. regenerat. of manganese) Dunlop. xviii, 219; Weldon. xviii, 220—has no act. on sodium, Wanklyn. xviii, 230—solubility, Berthelot. xxix, 245; xxx, 270—spec. gr. differs with temp., Meyer; Crafts; Lüblin. xxviii, 218—test, (as chlorochromic ac.), Riley. xxix, 245; in pres. of bromine (water, ether) Hager. xix, 186; (sulphoc. am.), Volhard. xxvii, 322.
- LIQUID**, prep., Senior and Lowe. xxv, 242.
- Chlorobrom-ACETON**, prop., Thiergarten. xxiii, 371.
- Chloro-CODEIA**, physiol. act., Ott. xxvi, 277.
- COLOPHIALIN**, prop., Curie. xxiii, 321.
- Chlorodyne**, must contain belladonna, Donas. xix, 419—prep.: Ebert. xxii, 69; Hancock. xxii, 338; xxiii, 610; McNutt. xxix, 66; Mattison. xxiii, 488; Phil. Hosp. xxiv, 80; De Puy. xxviii, 61; Smith. xviii, 214; Squire. xxiv, 80.
- Chloroform**, act. of alcoh. pot., Berthelot. xxvi, 491; upon resins, gum resins, balsams, Hirschsohn. xxvi, 454—administration (oil almonds). xxi, 174; (glycerin). xix, 253—adulteration, alcohol. xix, 343; test for alc. (caust. pot., sulph. copper), Blancher. xviii, 244; (sulphomolybdic ac.), Boettger. xxviii, 274; (iodof. test), Hager. xviii, 244; (iodine), Siebold. xxviii, 279—requires a large quantity of water to separate alc., Madsen. xxiv, 290—estimat. of alc. (cinchonia), Pudemans, Jr. xxi, 332—for removing alkaloids fr. their alkaline solut., Nowak. xxi, 367—antagonistic to amyl nitrite. xxvi, 493—fr. chloral,

Chloroform (Continued).

- Schacht. xix, 252; is not as pure nor stable as Schering claims, Schacht. xxiv, 290; Vulpius. xxvii, 409—for separating cinchona alkaloids, Hesse. xxiii, 406—commercial contains fusel oil, Remys. xxiii, 514—decomp. causes, Hager. xviii, 243; test for decomp. (ammonia), Hager. xviii, 244; (nitr. silv.), xix, 343; by light and air into phosgene gas, Emmerling and Lengel. xix, 252; decomp. of chloral chlorof., Biltz. xix, 252—forensic detection (current of hydrog., ignite), Vitali. xxx, 345—emulsified (milk), Jaillard. xxv, 92—English fr. chloral (indirectly), Schering. xxi, 333—and ether mix with elevat. of temp., Greene. xxvii, 409—generation (pentachlor. phosph., iodof.), Gautier. xix, 252—yields no iodoform, Hager. xxx, 346—prop., etc., Rump. xxiii, 342—can not be formed fr. pure methyl. alc. and chlorine. lime, Belohoubek. xxi, 332—purificat., Werner. xxviii, 279; TESTS OF PURITY, Regnault. xxviii, 279; Lueke. xxvi, 490—review; recommends methylic alc., Mason. xxvi, 489—tests: Hager (opalescent alc.). xxx, 319; Hofmann (generat. of isonitrit). xix, 253—Regnault (Yvon's permang. pot. test unreliable). xxx, 345—prep. (fr. chlorine and methylchloride), Damoiseau. xxix, 295—spoiled, restored by hyposulphite soda, Shuttleworth. xxi, 331—in seasickness. xxii, 77—tolerance (53 pounds in 6 months), Squibb. xxi, 142—detect. in urine (Fehling not reliable), Reichardt. xxvii, 546.
- Chloroform, PHOSPHORATED**. xxvii, 92.
- Chlorogalum POMERIDIANUM**. California. xxvii, 284, 611.
- Chlorogenin**, in *Alstonia constricta*, Hesse. xxvii, 174—identical with Alstonin, Hesse. xxix, 154.
- Chloro-methylic OXIDE**, precaution in preparat., Friedel. xxiv, 293.
- Chlorophenols**, disinfecting power, Cech. xxix, 299.
- Chlorophyll**, components, Hoppe-Seiler. xxix, 354—proximate constitution, Schwabe. xix, 309—nature of, Wiesner. xviii, 455—relation to bilirubin, Gautier. xxviii, 352—crystallized, Gautier. xxviii, 352; is a mixt. of erythrophyll and chlorophyllan, Hoppe-Seiler. xxix, 354—prep. and uses, Secourt and Guillemore. xxvii, 532—prop., Harsten. xxi, 393—two coloring principles, Hoppe-Seiler. xxviii, 351; xxix, 354—pure. Harsten. xxiii, 456—act. of reducing agents, Church. xxvii, 531.
- Chlorophyllan**, Hoppe-Seiler. xxviii, 352; xxix, 354.
- Chloroplatinites**, prep. and prop., Wilson. xxvi, 426.
- Chob-chini**=*Smilax* China, India. xxix, 222.
- Chocolate**, adult. xxi, 501; (bean-starch). xxiv, 418—examin., Herbert. xxx, 69—estimat. of theobromin, Wolfram. xxvii, 514.
- GABON**—fat fr. seeds of *Irvingia Barteri*, Africa. xxix, 116.
- Cholera MIXTURES**, Ebert. xxii, 68; Garaud, (silicate magnesia). xviii, 232; Hamlin. xxii, 68; Ruschenberger. xxii, 69; Russian. xxvi, 126.
- Cholesterin**, sulph. ac test improved, Salkowski. xxi, 405—heavier than water, Méhu. xxiv, 392—in ergot, Stahl and Höhn. xix, 262—in wool fat (suinte) Schulze. xix, 251; xxii, 243.
- Choleverdin**, fr. bile, Stockeis. xxi, 405.
- Cholin**=neurin. xxvi, 611.
- Chondodendron TOMENTOSUM**, structure of stem, Moss. xxiv, 159—true source of Pareira, Hanbury. xxii, 128. See also **PAIREIRA**.
- vs. *Chondrodendron*, Miers and Hanbury. xxiii, 179.
- Chondrus CRISPUS**, see **IRISH MOSS**.
- Chordaria FILUM**, Turkestan. xxi, 203.
- Chose-nasa-gao**=*Datura alba*, Japan. xxviii, 124.
- Chota-chand**=*Ophioxylon serpentinum*, India. xxviii, 141.
- gokhroo**=*Tribulus terrestris*, India. xxvi, 159.
- mai**=galls of *Tamarix orientalis*, India. xxvi, 281.
- Chowchow**, adult, (aconite root). xxiii, 521.

- Chromium.** xxi, 302; xxii, 198; xxiii, 294; xxiv, 249; xxv, 260; xxvi, 398; xxvii, 353; xxix, 266; xxx, 297.
- **SALTS**, act. of reagents, Etard. xxiii, 294; xxv, 261—act. of trimethylamin, Vincent. xxv, 315.
- and **ARSENIC** compound, prep. and prop., Neville. xxv, 260.
- **ALUM**, Lielegg. xxii, 198—cause of color change, Boisbaudran and Gernez. xxiii, 295.
- **CHLORIDE**, (green cryst.) prep., Meugeot. xxix, 266—act. of ozone, Maillet. xxx, 259.
- **HYDRATES**, (four) Loewel. xxiii, 294.
- **IRON** ore, occurrence in Japan, Divers. xxx, 297; assay, Christomanos. xxvi, 398.
- **PHOSPHATE** (violet; green), Etard. xxvi, 399.
- **SELENIDES**, (mono-; sesqui-); prep. and prop., Moissan. xxix, 266.
- **SULPHATE** (violet; green), Etard. xxvi, 399—act. of ozone, Maillet. xxx, 259.
- **SULPHIDES**, prep. and prop. (mono-; sesqui-), Moissan. xxix, 266.
- **SULPHITE**. xxx, 297.
- **TUNGSTOBORATE**, Klein. xxx, 302.
- Chromograph.** xxviii, 95. See also **HECTOGRAPH.**
- Chrysanthemum ALBUM**, as anti-spre in China. xxiv, 752.
- **CORONARIUM**, worthless as insecticide, Kalbrunner. xxiii, 166.
- **FLAVUM**, China. xxiv, 752.
- **LEUCANTHEMUM**, worthless as insecticide, Kalbrunner. xxiii, 166.
- **SEGETUM**, Greece. xxv, 156.
- see also **PYRETHRUM.**
- Chrysarobin**, examin., Atfield. xxiii, 213—in Goa powder, Liebermann and Seidler. xxvii, 474—distinct. fr. chrysophanic ac., Liebermann and Seidler. xxvii, 476.
- Chrysenin** (fr. chrysen), Phipson. xxiii, 432.
- Chrysin** in poplar buds, Piccard. xxii, 162.
- Chrysobalanus ICACO**, Africa, descript. of seeds, Möller. xxix, 116—in Brazil. xxvii, 155.
- Chrysolin**, fr. resorcin (is soda salt of benzyl. fluorescein), Reverdin. xxvi, 625.
- Chrysomela POPULI**, cont. salicylous ac. xxiii, 746.
- Chrysophyll**, prep., Harsten. xxi, 394; xxv, 384.
- Chuay-choa** (CHUAY-OZU) = *Sophora Japonica*, China. xxi, 211.
- Chucu** = *Nurembergica hippomanica*, Arg. Republ. xxx, 138.
- Chuen-woo** = a species of aconite, China. xxix, 175.
- Ch'uen-wu-t'u** = *Aconitum Chinense*, China. xxix, 173, 175.
- Chuka** (kra) = *Rumex vesicarius*, India. xxviii, 117.
- Chu-lan** = *Chloranthus inconspicuus*, China. xxiv, 744.
- Chulcheleera** = *Parmelia Kamtschadalis*, India. xxiv, 718.
- Chunam** = lime, India. xxiv, 715.
- Churee chentz** = *Adansonia digitata*, India. xxv, 182.
- Churfa** = *Portulaca oleracea*, Turkestan. xxi, 244.
- Churmades** = Dates, Orient. xxv, 124.
- Churrus**, resin of Indian hemp. xxi, 261.
- Cicendia HYSSOPIFOLIA**, India. xxviii, 135.
- Cichorium INTYBUS**, Chili. xxiv, 765.
- see also **CHICORY.**
- Cicuta CALIFORNICA**. xix, 302.
- **MACULATA**, Kansas. xxix, 452.
- **VIROSA**, root most poisonous, Trojanowski. xxvi, 248.
- Cicutoxin**, Trojanowski. xxvi, 248.
- Cigar bush** = *Critonea Dalea*, Jamaica. xxx, 153.
- Cigars**, *EUCALYPTUS*, for asthma. xix, 276.
- Cigarettes**, **ANTASTHMATIC**. xxvi, 152; xxvii, 123.
- Cimicifuga**, 80 years ago. xxvi, 849—neutral principles, Conard. xix, 264—analysis, Trimble. xxvii, 200—poisonous prop. xviii, 287.
- Cimicifugin** (eclectic), examin., Beach. xxiv, 411; xxv, 97—solubility, Parker. xxx, 128.
- Cina-cina**, Arg. Republ. xxiv, 763.
- Cincholine**, Hesse. xxx, 405.
- Cinchona**, adult. (poor quality) xix, 333; (with tinct. quinoidia). xxi, 478; (exhausted bark). xxi, 486; (mineral adult. detect. by chlorof.). xxviii, 278;—xxx, 576, 580.
- **ALKALOIDS**: distribution in the tree, Howard.
- Cinchona** (*Continued*).
- xxvi, 230—cellular tissue richer in alk. than the fibrous, Howard. xxviii, 151—the kind of alk. depends much on growth, Vrij; Howard. xxiii, 170—exist chiefly as tannates with free kinic acid, Vrij. xxviii, 325—constitution, Skraup. xxvii, 495; Hesse. xxix, 326—crude, prep., Eberbach. xx, 271; adult. not easily detected, Rickey. xxiii, 644; xxiv, 347—**ESTIMATION** (see also **C. BARK, ASSAY.**): Hager. xxix, 327; Oppermann. xxviii, 325; Prunier. xxviii, 325; Schacht. xxix, 326; cinchonia in excess prevents complete extract. of soluble alk., Sharples. xxvi, 827; Vogl. xvii, 281—by microscope (as sulphocyanide), Godefroy and Ledermann. xxv, 569; Schrage. xxiii, 409; xxvii, 488; conditions for successful applic., Hesse. xxvii, 492, 3—iodosulphates (each alk. requires a diff. quantity), Dvars. xxvii, 496—review, Hesse. xxii, 396; xxvi, 565—act. of acids upon rotating power, Oudemans, Jr. xxiv, 342—separable by chloroform, Hesse. xxiii, 405, 6; separat. and estimat., Prescott and Thum. xxvi, 828—distinct fr. each other, Sharples. xxvi, 826; Vrij. xxii, 267; discussion. xxvi, 90—comparat. value of U. S. Ph. revision tests, Teeter. xxix, 327—a peculiar alk., found in mother liquor aft. cryst. of quin. sulph., Howard. xix, 230.
- **AMORPHOUS** bases, Hesse. xxiii, 404.
- **BARK**: value of aqueous extraction, Vrij. xxiv, 149—**ASSAY**, see also **CINCHONA ESTIMAT.**: Alessandri (oxalic ac.). xxx, 206; Carles (lime chlorof.). xix, 280; Cleaver (lime, methyl. alc.). xxiv, 150; Cotton (soda, ether). xxiii, 175; Flückiger (lime, ether, soda). xxx, 203; Gunning (carb. pot., gypsum, tinsel oil). xix, 281; Herbelin (ammonia, benzol). xxiv, 152; Lepage and Patrouillard (cadm. and pot. iod.). xxv, 168; Perret (silicate soda, ether). xxiii, 411; Prollius (chlorof. (ether), ammon.). xxx, 204; improved by Biel. xxx, 25; Schneider (lime, alc., soda). xix, 282; Smith. (permangan. pot.). xxvii, 190; Squibb (lime, tinsel oil, oxal. ac., ether, chlorof.). xxx, 205; Van den Burg (none yield reliable results). xix, 281—commercial analysis (ether process). xxviii, 153; (acid process). xxviii, 155; Muter (modif. of Vrij and Moens). xxix, 163; pharmaceut. tests, Vrij. xxiii, 174.
- Cinchona BITTER**, see **ACID, KINOVIC.**
- Cinchona** vs. **CHINCHONA**, Markham and Hanbury. xxiii, 108.
- of **COUNTRESS CHINCHON** (=Royal crown Loja quills), Howard. xxvii, 815.
- **COLLECTION**, Wellcome. xxvii, 825—of **COMMERCE**, Flückiger and Berg. xxvii, 184; in U. S. commerce, Reeve. xxix, 163.
- **CULTIVATION**: history, Wilder. xxvii, 184; under glass, Howard. xviii, 281; and conditions of growth, Kuntze. xxvii, 185; one-half of cultivated are bastards, Kuntze. xxvii, 186; bark improves by age, Howard. xxviii, 150; increasing of quinia yield, Schrottky. xxx, 194; replacing native barks with cultivated, Holmes. xxx, 195; denies that cultivated are better than natives, Neutville. xxx, 196—in Bengal, history, Wood. xxvi, 233—Bolivia. xxix, 162; analysis, Stöcker. xxvii, 188—Island of Bourbon, Vinson. xxiv, 146; attacked by *Deilephila Nerii*. xxiv, 146—California proposed, Weaver. xxviii, 151—Ceylon, Thwaite. xxiv, 146; McMillan. xxvi, 236; xxviii, 186—Darjeeling. xxii, 121—East India. xix, 277; xxiii, 169; number in Brit. India. xxvii, 186—Jamaica, analysis, Vrij. xxii, 121; cultivat. xxiv, 733; instructions. xxx, 195—Japan. xxv, 167—Java. xxii, 122; xxiii, 151; xxiv, 742; xxv, 166; xxvi, 263; xxviii, 151; history, Kuntze. xxvii, 185; analysis, Jobst. xxi, 228; number of trees. xxvii, 186; over six years old, lose their value, Kuntze. xxvii, 185—Madeira. xxiii, 171—Martinique. xix, 280—Mauritius. xxiv, 146—Mexico. xix, 279—Ootacamund (manure of guano and sulph. am.), Broughton. xxi, 227—Peru. xxv, 28, 167—Portugal. xxi, 226—isle of Reunion. xviii, 281—St. Helena. xix, 280; xxiii, 171—Sikkim. xxi, 227; xxv, 165; xxvi, 233; xxix, 161.
- **drug market**. xx, 119; xxii, 622; xxviii, 370;

Cinchona (Continued).

- xxix, 371; xxx, 465—loss by drying. xxv, 166.
- **FEBRIFUGE**. xxv, 29—prep., Broughton. xxv, 306—therapeut. act, King. xxv, 305; Wood. xxvi, 235—contains aricina, Howard. xxvii, 497; denied by Hesse. xxvii, 497—crystalline. xxx, 407.
- history of its uses, Hancock. xxii, 487—hybridization. xix, 279; Kuntze. xxvii, 186; regular hybrids. xxvii, 187; irregular hybrids. xxvii, 188; quinia in total p. c. is increased in direct ratio to irregularity of hybrid, Kuntze. xxvii, 187—ancient objections to its use. xxvi, 847—a yellowish oil fr. mother liquors, Howard. xix, 282—comparat. strength of diff. prepar. fr. the same bark, Ekin. xxvii, 191—at one penny per pound. xxii, 623.; powd., susp. price, yellow, (6-15 cts.), red (10-90 cts.). xxiv, 394—cinchonas rich in quinia require certain temp. and wind, Kuntze. xxvii, 185—quinia decreases in warm climates. xxvii, 186—root bark often richer than trunk bark. xxv, 29; 165—distribution in South America, Røssing. xxvii, 183; forests of South America, Wellcome. xxvii, 814—sp. grav. of barks, Arnaud. xxx, 201—cinchona is not attacked by *Tinea Zee*, Saunders. xxi, 627.
- Cinchona, ASHY CROWN** (= *C. cordifolia* var. *rotundifolia*), re-discovered by Ernst. xix, 280.
- **BERGENIANA**, Brazil. xxx, 200.
- **CALISAYA** yields "Regia" bark. xxvii, 184—"flat." xxvii, 188, 189, 825—sp. gr. xxx, 201—"Para" bark) cont. quinamina, Hesse. xxvi, 567—"Schuhkraft," cont. quinamina, Hesse. xxvi, 567—in Ceylon. xxvii, 146, xxix, 162—in Jamaica. xxiv, 733; analysis, Vrij. xxii, 121—in Java. xxiv, 742; quality of bark, Möns. xix, 279; contains much quinidia, Hesse. xxiii, 172; cont. javanina, Hesse. xxvi, 569; analysis, Jobst. xxi, 228—in Mauritius. xxiv, 147—in Sikkim. xxi, 227; xxvi, 233; xxix, 161.
- **CALOPTERA**, Java. xxiv, 742; xxvii, 186; statistics. xxviii, 151.
- **CHARHARGUERA** yields "Loxa" bark. xxvii, 184.
- **COCCINEA**. xxx, 197.
- **CONDAMINEA**, yields "Huamalies" bark. xxvii, 184—in Madeira. xxiii, 171.
- **CONGLOMERATA** (colorada). xxx, 198.
- **CORDIFOLIA**, var. *ROTUNDIFOLIA*, re-discovered by Ernst. xix, 280—two forms, Howard. xxx, 197—sp. gr. xxx, 201—habitat. in So. America, Røssing. xxviii, 183—yields "flava dura laevis." xxvii, 184.
- **CROWN BARK**, E. I. renewed, p. c. alkaloids, Paul. xxiv, 149—in India. xxiii, 170.
- **CUPREA**, source, Triana. xxx, 199—on exhibition. xxix, 397—contains aricina and cusconina, Hesse. xxx, 203—cont. a new alkaloid (= "ultra quinine" of Whiffen) Paul; Cownley; Whiffen. xxx, 202, 3—"Llanos," sp. gr. xxx, 201; p. c. of alk. xxx, 202—"Buccaramanga," sp. gr. xxx, 201; p. c. of alk. xxx, 202.
- **ERYTHRANTA** cont. quinamina, Hesse. xxvi, 567—"cuchicara." xxx, 198.
- **ERYTHRODERMA** cont. quinamina, Hesse. xxvi, 567.
- "FALSE." xxvii, 190.
- **FERRUGINEA**. xxx, 200—cont. vieirina. xxvii, 182.
- **FLAVA DURA LAEVIS**, fr. *C. cordifolia*. xxvii, 184.
- **FLAVA DURA SUBEROSA**, fr. *C. lutea*. xxvii, 184.
- **FLAVA FIBROSA**, fr. *C. lancifolia*. xxvii, 184.
- **HASSKARLIANA**, Java. xxiv, 742; xxvi, 237—number in Java. xxvii, 186; xxviii, 151—analysis, Jobst. xxi, 228—root-bark, analysis, Howard. xxvi, 232.
- **HETEROPHYLLA**, yields "Loxa" bark. xxvii, 184.
- **HOWARDIANA**, British India. xxvii, 186—in Ceylon. xxvii, 186.
- **HUANUCO**, fr. *C. micrantha*. xxvii, 184.
- **HUAMALIES**, fr. *C. condaminea* and *C. scrobiculata*. xxvii, 184.
- **LANCIFOLIA**, Java. xxiv, 742—number in Java. xxvii, 186; xxviii, 151—habitat. in So. America, Røssing. xxvii, 183—yields "flava fibrosa." xxvii, 184—sp. gr. xxx, 201.
- Cinchona, LEDGERIANA**, history. xxvi, 237; xxviii, 152—in Java. xxii, 123; xxiii, 172; xxvi, 237—number in Java. xxvii, 186; xxviii, 151—is really sterile, Kuntze. xxvii, 187—yield (up to 13 p. c. quinia). xxv, 167; xxvii, 187—in Java rootbark, alkaloids, Howard. xxvi, 232—in Sikkim. xxix, 162.
- **LOXA**, fr. *C. charharguera*; *C. heterophylla*; *C. macrocalyx*; *C. uritusinga*. xxvii, 184.
- **LUTEA**, yields "flava dura suberosa." xxvii, 184.
- **MACROCALYX**, yields "Loxa" bark. xxvii, 184.
- **MACROCNEMIA**, Brazil. xxx, 200.
- **MICRANTHA** yields "Huanuco" bark. xxvii, 184—in Jamaica, analysis, Vrij. xxii, 121—in Java. xxiv, 742—number in Java. xxvii, 186—in Sikkim. xxi, 227; xxvi, 233.
- "MONOPOL." xxvii, 188.
- **NITIDA**, cont. quinamina, Hesse. xxvi, 567—in Sikkim. xxi, 227.
- **OFFICINALIS** (Howard). xxx, 197—renewed bark cont. a great increase of quinidia, Howard. xxvi, 230—manured, yield of alk., Broughton. xxi, 227—in Bourbon. xxiv, 146—in Ceylon. xxvii, 186—at Darjeeling. xxii, 121; rootbark, alk., Howard. xxvi, 231—"amarilla del Rey" p. c. of alk., Paul. xxiv, 149—in Jamaica. xxiv, 733; analysis, Vrij. xxii, 121—in Java. xxii, 122; xxiv, 742; number in Java. xxvii, 186; xxviii, 151; analysis, Jobst. xxi, 229—in Mauritius. xxiv, 147—in Neilgherries. xxiii, 171—in Ootacamund, analysis, Howard. xxiii, 170—in Sikkim. xxi, 227; xxvi, 233.
- **PAHUDIANA**, Jamaica, analysis, Vrij. xxii, 121—in Java. xxiv, 742; number. xxvii, 186; analysis, Jobst. xxi, 229—in Mauritius. xxiv, 147—in Sikkim. xxvi, 237.
- **PALTON**. xxiii, 402.
- **PAYTA** ("white") cont. a large amount of starch, Hesse. xix, 279.
- **PEDUNCULATA**. xxx, 196, 199.
- **PERUVIANA**, in Sikkim. xxi, 227.
- "PIGSKIN"—*C. erythranta cuchicara*. xxx, 198.
- **PITAYENSIS**, in Sikkim. xxvi, 234—sp. gr. xxx, 201.
- **PUBESCENS**, yield of alk., Vrij. xxvi, 239; Howard. xxvi, 240—yields "rubiginosa" xxvii, 184—history, Howard; MacIvor. xxvi, 239.
- "QUILL." xxvii, 189, 825.
- "RED," source, Howard. xxx, 196, 7.
- "REGIA," fr. *C. calisaya*. xxvii, 184.
- **REMIJIANA**. xxx, 200.
- **ROSULENTA**, cont. quinamina, Hesse. xxvi, 567—sp. gr. xxi, 201.
- **RUBIGINOSA**, fr. *C. pubescens*. xxvii, 184.
- **RUBRA**, fr. *C. succirubra*. xxvii, 184.
- **SCROBICULATA** yields "Huamalies." xxvii, 184.
- **SUCCIRUBRA**, account, Howard. xxx, 197—analysis, Mattison. xxx, 198, 9—commercial mostly worthless, Mattison. xxx, 198—manured, yield of alk., Broughton. xxi, 227—mossed, Paul. xxiv, 149—old bark worthless, since the resinification goes on, Howard. xxx, 197—renewed bark, a large and increased yield of quinidia, Howard. xxvi, 230—cultivated bark the most suitable for pharmaceut. purp., Flückiger; Holmes. xxx, 195—cont. often paricina and quinamina, Hesse. xxiii, 403—sp. gr. xxx, 201—yields "rubra." xxvii, 184—in Ceylon. xxvi, 236; xxix, 162; analysis, Mattison. xxx, 199—at Darjeeling. xxii, 121; cont. paricina and quinamina, Hesse. xxvi, 567—rootbark, alk., Howard. xxvi, 231, 2—in East India p. c. of alk., Paul. xxiv, 149; cont. quinamina, Hesse. xxi, 230; analysis, Mattison. xxx, 199—in Jamaica. xxiv, 733; analysis, Vrij. xxii, 121; Mattison. xxx, 199—in Java. xxiv, 742; number. xxvii, 186; xxviii, 151; analysis, Jobst. xxi, 229; Mattison. xxx, 199; rootbark, alk., Howard. xxvi, 231—in Madeira. xxiii, 171—in Mauritius. xxiv, 147; p. c. alk., Bernard. xxiv, 147, 8—in Neilgherries, renewed bark, Howard. xxiii, 170—in Sikkim. xxi, 227; xxix, 161; yield. xxvi, 233, 4, 5.
- **TUCUYENSIS**. xix, 280.

Cinchona, UNDATA. xxx, 196.

— URITUSINGA, yields "Loxa" bark. xxvii, 184.

— VELOZII. xxx, 200.

Cinchonamina, fr. *C. cuprea*, Arnaud. xxx, 415, 6.

— CHLOROPLATINATE;—*C. HYDRIODATE*;—*C. MURIATE*;—*C. NITRATE*;—*C. SULPHATE*, Arnaud. xxx, 416.

Cinchonia, act. of ferric chlor., butter antim., stannous chlor., Godeffroy. xxvi, 559; of permang. pot., Caventou and Willm. xviii, 262; Skraup. xxvi, 584; act. of bichrom. mixt. chlorin. lime, Hamlin, Jr. xxix, 324, of sulphomolybdate ammon., Buckingham. xxi, 369—administration (sug. milk, bicarb. sod.), Ashhurst. xxvi, 585—constitution, Filetti. xxviii, 330; Skraup. xxvii, 495; (Laurent's correct), xxvi, 584—derivatives, Wischnegradsky. xxviii, 331—estimat. (bism. and pot. iod.), Thresh. xxviii, 320—in excess prevents complete extract. of ether-soluble alk., Sharples. xxvi, 827; extract. by benzol, Boiraux and Leger. xxiii, 416—history, Hesse. xxiii, 402—(of Skraup) identical with homocinchonia, Hesse. xxvi, 567—directly fr. the bark (fr. "gray Loxa;" lime, ether), Caze-neuve. Caillol. xxvi, 583—prop., Hesse. xxvi, 566—test for purity (iodine), Dwars. xxvii, 496—solubility in alc., Lafean. xxix, 324; in chlorof., Hesse. xxiii, 406; Oudemans, Jr. xxi, 332—synthesis probable (fr. dihydrolepidin, etc.), Wischnegradsky. xxviii, 331—red color with spir. æth. nitr., am. and chlor. iron, due to acet. ac., and not to cinchonia, Maisch. xxi, 370—microsulphocyanide test, Godeffroy and Ledermann. xxvii, 571; Schrage. xxvii, 490; xxvii, 490, 1—sulph. ac., ferr. chlor. test, How. xxvi, 561.

Cinchonia with BILIARY acids, Arbore. xxi, 371.

— BINIODIDE, Bauer. xxiii, 408.

— HYDRIODATE, Bauer. xxiii, 408.

— HYDROBROMATE, Bullock. xxiii, 705, 6.

— MURIATE, as adulterant of quin. sulph. xxi, 100, 102—action of Am. manuf. regard. its indiscriminate sale. xxi, 102, note.

— and QUINIA IODIDE, Bauer. xxiii, 407.

— SULPHATE, as febrifuge without ill effects, Briquet. xxi, 380—fluid volume, Candidus, xxvii, 709—purificat., Prescott; Thum. xxvi, 828—solubility in chlorof., Hesse. xxvi, 829.

— TRI-IODIDE, Bauer. xxiii, 408.

— TUNGSTOBORATE, Klein. xxx, 302.

Cinchonichin, Drygin. xxvii, 504, 6.

Cinchonidia, Hesse. xxiv, 353; xxvi, 566.

Cinchonidia, act. of bichrom. mixt., chlorin. pot., Hamlin, Jr. xxix, 324—history, Hesse. xxiii, 400; xxvi, 566—estimat. (bism. and pot. iod.), Thresh. xxviii, 320—identical with aricina, cusconina, cinchovatina, Hesse. xxv, 29; 305—microsulphocyanide test, Godeffroy and Ledermann. xxvi, 571; Schrage. xxvii, 490; Hesse. xxvii, 494—test for purity (iodine), Dwars. xxvii, 496—soluble in alcohol, Lafean. xxix, 324; in chlorof. Hesse. xxiii, 406.

Cinchonidia (α , β), Kerner. xxiii, 401.

— of Koch, is homocinchonia, Hesse. xxvi, 566—of Pasteur, composition, Hesse. xxvi, 569, note—of Wittstein. xxiii, 401.

— BROMIDE. xxviii, 370.

— DIHYDROBROMATE. xxix, 372.

— MURIATE, Hesse. xxiii, 401.

— SALICYLATE. xxix, 372—physiolog. effect, James. xxix, 314.

— SULPHATE, drug market. xxv, 341; xxvii, 555, 560; xxviii, 370; xxix, 372; xxx, 466—detect. in sulph. quinine (fract. crystall.), Paul. xxv, 304—purification, Prescott and Thum. xxvi, 829—distinct. fr. quinidia; history, Bouchardat. xxvi, 583—therapeut. value, Bourru. xxix, 332—solubility in chlorof. and water, Hesse, Hager, Kerner, etc. xxvi, 829—in ether, increased by presence of sulph. quinia, Paul. xxv, 304.

— TANNATE. xxix, 372.

Cinchoquinine, chiefly cinchonia, Ebert. xxii, 448; Wenzell. xviii, 214—cont. quinine, Mariner, Blaney, Genth, Sharples. xxii, 645, 6—cinchonia with two p. c. other alk. sulph., Maisch. xxiii, 515—editorial note, Maisch. xxii, 645—embroglio. xxiii, 769.

Cinchotenidina, Skraup. xxvii, 496.

Cinchotenina, Caventou and Willm. xviii, 262; Skraup. xxvi, 584; xxvii, 495.

Cinchotina, (=hydrocinchonia of Caventou and Willm), Skraup. xxvii, 495.

Cinchovatina (=aricina of Pelletier and Caventou). xxiii, 402—(of Manzini) identical with cinchonidia, cusconina, aricina, Hesse. xxv, 29, 305—(of Winckler) ident. with homocinchonidia, Hesse. xxvi, 566.

Cinco folhas = *Sparattosperma leucantha*; *Cybis-tax antisiphilitica*; *Bignonia depauperata*. Brazil. xxvii, 166.

Cinnabar, deposit in Borneo. xix, 210.

— see also VERMILLION.

— RED, = anhydrous oxide copper (=Fehling's test, inverted), Böttger. xxi, 304.

Cinnamon, (Ceylon) adult. of powd. (exhaust. bark). xxi, 486; mineral adult. detect. by chlorof. xxviii, 278—distinct. fr. Cassia (color of ash; amount of manganese), Mehner. xxviii, 117—quality estimat. (iodine), Woodland. xxx, 154.

Cinnamomum LAMARKII, Japan. xxiii, 120.

— LOURKEI, uses in India, Dymock. xxvi, 163

— examin. of oil (Japan), Martin. xxvii, 147.

— PEDUNCULATUM, Japan. xxviii, 293.

— TAMALA, India. xxv, 181.

Cinnamyl, ACETO-, Leist. xxii, 235.

— TROPEIN, Ladenburg. xxix, 337; xxx, 424.

Cipo senna—*Anchieta salutaris*, Brazil. xxiii, 120.

Circæa LUTETIANA, Kansas. xxix, 448.

Circium ARVENSE, Kansas. xxix, 442.

Ciruelillo—a spec. of *Embothrium*, Chili. xxiv, 765.

Cissampelos MAURITIANA, Mauritius. xxiv, 741.

— PAREIRA, not the true source of Pareira, Hanbury. xxii, 128. See also PAREIRA.

Cissus LATIFOLIA, India, descript. and uses of root, Dymock. xxv, 187.

— TILIACEA, Mexico. xxiv, 777.

Cistaceæ. xxiii, 204; xxiv, 182; xxvii, 224; of Kansas. xxix, 441.

Cistus ALBIDUS, Algeria. xxvi, 278.

— BALSAMIFERUS, Greece. xxiv, 182.

— CRETICUS, Greece. xxiv, 182; xxvii, 224.

— LADANIFERUS, Greece. xxvii, 224.

— SALVIFOLIUS, Morocco. xxiii, 204—Greece. xxvii, 224.

— VILLOSUS, Greece. xxiv, 182.

Citrates, AMMONIACAL, double, constitution, Landrin. xxvii, 471; xxx, 393.

Citrate of MAGNESIA. See LIQUOR MAGNESII CITRATIS.

Citrene (=terpene of oil lemon), Tilden. xxvii, 389.

Citriol (=hydrocarbon fr. wood tar), Thenius. xxvi, 431.

Citronellol, Wright. xxiii, 333.

Citrullus VULGARIS, uses in India, Dymock. xxvii, 229.

Citrus, review of American, Rush. xxvii, 210.

— BIGARADIA, var. TRIFOLIA, Japan. xxviii, 169.

— DECUMANA, China. xxiv, 743—Java. xxvii, 526.

— FUSCA, Japan, descript., Holmes. xxviii, 169.

— LIMETTA, oil, Piesse and Wright. xxvi, 440.

— MARGARITA, China. xxiv, 755.

Cladophora GLOMERATA as source of iod. and brom., Zenger. xxiii, 246.

Clamp, BURETTE, Benjamin. xxvii, 59—substitute. Mylius (glass rod in rubber tube, and pinching), xxii, 47—Pellet (glass ball in rubber tube, and pinching). xxix, 32.

—, PARALLEL, Muencke. xxvii, 58.

Clandestina RECTIFLORA, examin. of flowers, Harsten. xxi, 214.

Clarifying, prep. of paper pulp, Puy. xxx, 40—sulph. magnes., milk of lime, Tschirikow. xxx, 41—of hydro-alcohol. distillates (chlor. calc., sod. phosph.) Allen. xxviii, 81.

— POWDER (clay and blood, charred), Pfandler. xxix, 43.

Clary—*Tharidium indicum*, Jamaica. xxvii, 165.

Clavel DEL CAMPO, Arg. Republ. xxiv, 763.

Clay, suspension power, Durham. xxiii, 283.

Claytonia ALSINOIDES, amount of sugar in the nectar of flowers, Wilson. xxvii, 442.

- Claytonia PERFOLIATA**, California. xix, 299.
Cleanliness as a pharmaceutical virtue, Ayers. xxii, 348.
Cleavers, DYERS'—*Galium tinctorium*;—C. SMALL.—*Galium trifidum*. Kansas. xxix, 450.
Clematin, Gaube. xviii, 288.
Clematis CIRRHOSA, Greece. xxvii, 248.
 — **LASIANTHA**;—C. **LIGUSTRIFOLIA**, California. xix, 298.
 — **MAURITIANA**, Mauritius. xxiv, 741.
 — **SYLVESTRIS**, Greece. xxvii, 248.
 — **VIORNA**;—C. **VIRGINIANA**, Kansas. xxix, 449.
 — **VITALBA**, analysis, Gaube. xviii, 288—in China. xxiv, 753.
Clerodendron INFORTUNATUM, uses in India, Dymock. xxvi, 162.
 — **SEKRATUM**, uses in India, Dymock. xxv, 142.
Cliffortia ILICIFOLIA, Africa, descript., Jackson. xxii, 148.
Clitocybe BACCATUS;—C. **MAXIMUS**, contain oxal. ac., Hamlet and Plowright. xxvi, 178.
Clitoria TRINATA, India, descript. and uses, Dymock. xxv, 209.
Close, A. C. Chapped hands. xix, 488—diarrhoea mixture. xix, 488—emuls. cod-liver oil with glyconin. xxiv, 30—fumigat. pastilles of coffee. xix, 490—white of egg and glycerin. xix, 490—salt rheum; itching piles; toothache. xix, 489—Japan wax. xx, 233.
 — discussion. xviii, 83; xxiii, 807.
Closet, DRYING. See DRYING.
Clotweed, COMMON=*Xanthium strumarium*;—C. THORNY=*Xanthium spinosum*, Kansas. xxix, 443.
Clothing, NON-COMBUSTIBLE (phosph. ammon.), Siebdrath. xxvii, 121.
Clover, contains zinc, Bellamy and Lechartier. xxvi, 400.
 — **BUFFALO**=*Trifolium reflexum*, Kansas. xxix, 447.
 — **DUTCH**=*Trifolium repens*;—C. **PURPLE**=*Trif. tridentatum*, California. xxvii, 608.
 — **RED**=*Trifol. pratense*, adult. with white clover. xxv, 354—in cancer. xxix, 222—amount of sugar in nectar, Wilson. xxvii, 442—Kansas. xxix, 447; California. xxvii, 607.
 — **SWEET**=*Melilotus parviflora*, California. xxvii, 608.
Cloves, adult. (spent cloves and stems). xxviii, 177; of powd. xxx, 576—act. of sulph. ac. and alc., Doliber. xix, 444—drug market. xxii, 624; xxvii, 558, 560; xxx, 466—yield of oil, Osse. xxiv, 276.
Clown head=*Stachys palustris*, Kansas. xxix, 446.
Cnicus OCCIDENTALIS, California. xxvii, 193.
Coal, California. xxvii, 587—Pittsburgh market. xxi, 445.
 — **GAS**, test for sulphur (examin. soot for sulph. ac.), xix, 240.
 — **OIL**, what is a safe oil? Mahoney. xxv, 361—fr. destruct. distill. of coal, for extracting alkaloids, Boiraux and Léger. xxiii, 411—"CARBOLIZED" for extr. alkaloids, Boiraux and Léger. xxiii, 411.
 — **TAR**, components, Rütger. xxviii, 260—rare products. xxiv, 783.
 — **TAR NAPHTHA**=Benzol. xxviii, 260.
Coapinole=*Hymenea courbaril*, Mexico. xxiv, 767.
Cobnut=*Aleurites triloba*. xxiv, 732.
Cobalt. xxii, 197; xxiii, 291; xxvii, 350.
 — act. on nitr. ac., Acworth and Armstrong. xxvi, 343—act. of trimethylamin, Vincent. xxv, 315—separat. fr. iron, Moore. xxx, 296—test (cy. pot., yell. am. sulphide), Tattersall. xxvii, 350.
 — **OXIDE**, temp. of reduct. by hydrogen, Müller. xix, 138.
 — **PLATING**, Stolba. xxvii, 352.
 — **AMIDOSULPHONATE**, Berglund. xxvii, 331.
 — **BROMIDE**, Hartley. xxiii, 291.
 — **CHLORIDE** as a hygrometer, Woodbury. xxii, 197—act. of ozone, Mailfert. xxx, 259.
 — **IODIDE**, Hartley. xxiii, 292.
 — and **MERCURY SULPHOCYANIDE**, Skey. xxiii, 267.
 — **NITRATE**, act. of ozone, Mailfert. xxx, 259.
 — **SUCCINATE**, Lupton. xxiv, 328.
 — **SULPHATE**, act. of ozone, Mailfert. xxx, 259.
Cobalt TUNGSTOBORATE, Klein. xxx, 301.
Coca, account and preparations, Shuttleworth. xxiii, 197—literature, Simmonds. xxiv, 173, 4—history and uses, Steele. xxvi, 774—descript. xxv, 188—analysis, Niemann. xxvi, 785—drug market. xxv, 351; xxviii, 370; xxix, 372; xxx, 466—prevents fatigue, Shuttleworth. xxvi, 268—about addit. of lime, Rose. xxvi, 880—pharmac. prep., Kennedy. xxvi, 764—physiol. effects. xxvi, 778.
Cocaine, prep., Maisch. xxvi, 785; Niemann. xxvi, 765, 785; Truphème. xxix, 349.
Coccogenin, fr. mezereon, Casselmann. xix, 292.
Cocculus CAROLINIANUS, Kansas. xxix, 448.
 — **INDICUS**, detect. in beer, Dragendorff. xxx, 339.
 — **LAURIFOLIUS**, spheroids in epidermis. xxvii, 443.
 — **TOXIFERUS**, Brazil. xxvi, 216.
Coccus CACTI, see COCHINEAL.
 — **MANNIPARUS**, Sinai. xxv, 141.
 — **PELA**, China. xxviii, 293.
Cochineal, adult. (sulph. baryta). xix, 313, 334—coloring power, Küpfer. xxiv, 383—comparat. color test (permang. pot.), Merrick, Jr. xix, 313—cultivat. and statistic, Canary Islands. xxii, 170—detect. in wine, Chancel. xxvi, 266.
 — **COMPOUND POWDER**, Hancock. xxi, 119.
Cochlearia OFFICINALIS, oil diff. fr. oil of mustard, Hoffmann. xviii, 289—constitution of oil, Hoffmann. xxii, 223.
Cochlospermum GOSSYPIUM, India, in gonorrhoea. xxiii, 120—in India. xxiv, 718.
Cock, decoct. of old, China. xxvi, 843.
Cockroach, see BLATTA ORIENTALIS.
Coconotte=seeds of *Elais Guineensis*, Africa. xxviii, 105.
Cocum BUTTER, fr. *Garcinia purpurea*, India. xxiv, 725.
Codamina, Hesse. xviii, 262; history. xxi, 375.
Coddington, *Isaac*. xviii, 46, 48, 53.
Codeia, act. of succin., camphor., tart., oxal. acids at elevat. temp., Beckétt and Wright. xxiv, 342—act. of light, Flückiger. xxvi, 577; of sulph. ac. and ammonia, Armstrong. xix, 226; of bichrom. mixt., chlorin. lime, Hamlin, Jr. xxix, 324; of sulph. ac. and sugar, Schneider. xxi, 368; Hamlin, Jr. xxix, 325; of sulphomolybdic ac., Buckingham. xxi, 369; of chloride zinc, Wright. xxii, 266; xxiii, 391—antagonized by chloralhydrate, Husemann. xxvii, 507—is the methyl ether of morphia, Grimaux. xxx, 401—ident. with methyl morphia "a," Hesse. xxx, 402—electrolysis, Bourgoin. xix, 223—estimat. (bism. and pot. iod.), Thresh. xxviii, 320—history. xxi, 373—physiol. act., Ott. xxvi, 277—fr. morphia, Grimaux; Hesse. xxx, 401—TESTS: Ph. Germ. sulph. ac. test incorrect, Calmberg. xxiii, 395; Lindo (sulph. ac., ferric chlor.). xxvi, 559; Pellagri (mur., sulph. ac., soda, iodine). xxvi, 561; Prescott (Husemann's morphia test). xxvi, 562; Tattersall (arsen. sod.). xxviii, 324, 5—yields also apomorphia, Mathiesen and Wright. xix, 225.
Cod liver CREAM. xviii, 253.
 — **OIL**. See OIL, COD LIVER.
Codos de fraile=nuts of *Thevetia yccote*, Mexico. xxv, 149.
Coeruleine, fr. pyrogallac ac., Bayer. xix, 222.
Coffee, adult. (chicory) xxiv, 418; detect. (chlorin. lime), Rimmington. xxix, 164; glucose react., Vogel. xviii, 280; (date stones)—melilotin coffee. xxvii, 138—analysis (seven commercial varieties), Leverie. xxiv, 144—constituents of fruit, Boussingault. xxx, 207—green coloring matter, Zech. xxviii, 352—leaves, analysis, Stenhouse; Hehner. xxviii, 156—examin. of ground, Johnson. xxvi, 241—products of roasting, Bernheimer. xxix, 165—amount of soluble matter, Prescott. xxvi, 241.
 — **BEAN**=*Gymnocladus canadensis*, California. xxix, 447.
 — "COLOR" (Pruss. blue, chrom. lead, gyps.), xxi, 501.
 — fr. roasted DATE stones and apricot kernels. xxv, 124; xxvii, 138.
 — **ESSENCE**=caramel. xxiii, 521.

- Coffee, MELILOTIN**—(adult. with roasted date stones). xxvii, 138.
 — **MOGDAD** = seeds of *Cassia occidentalis*. xxix, 209.
 — **NEGRO** = seeds of *Cassia occidentalis*, Martinique. xxiv, 195; xxix, 209.
 — **TABLETS**, Doyen. xxiii, 106.
Coffin, S. L. Lupulin exhausted by spir. am. arom. xxviii, 438.
Cohosh, BLACK, adult. of powd. xxx, 576—use by the Indians. xxi, 619—see *CIMICIFUGA RACEMOSA*.
 — **BLUE**, adult. of powd. xxx, 576—use by the Indians. xxi, 619—see *CAULOPHYLLUM THALICTROIDES*.
 — **WHITE**, see *ACTAEA ALBA*.
Coins, U. S., weight. xxi, 580.
Coix EXALTATA, China. xxiv, 745.
 — **LACHRYMALIS**, China. xxiv, 745—uses in India, Dymock. xxv, 124.
Cokes, act. upon by conc. sulph. ac. produce a stain like graphite, Raoult. xxiii, 242—estimat. of sulphur, Sauer. xxii, 176.
 — **LIGNITE**, subst. for bone black, Matthey. xxvii, 317.
Cola ACUMINATA, account xxx, 472; Jamaica. xxiv, 735—exam. of seeds, Hanausek. xxvi, 253.
 — **DE LEON**, Arg. Republ. xxiv, 763.
 — **DE QUIQUINCHO**, Arg. Republ. xxiv, 763.
Colchicin, act. of arseniate soda, Tattersall. xxviii, 324, 5—formula, Hertel. xxx, 432—forensic estimat., Dannenberg. xxv, 311—commercial seldom cont. as much as 20 p. c. pure colchicin, Hertel. xxx, 431—as test for mineral acids, Flückiger. xxiv, 364—prep., Eberbach. xxiii, 4.6; Hertel. xxx, 431; Rosenwasser. xxiv, 188—solubility in alc., Lafcan. xxix, 324.
Colchico-RESIN, formula. Hertel. xxx, 432.
Colchicum, detect. in beer, Dragendorff. xxx, 339—flowers cont. a volatile toxic alk., Pierre. xxiii, 130—root, adult. of powd. xxx, 576—value according to age and time of collect., Beckert. xxvi, 186.
 — **SEEDS**, cont. probably a second alkaloid, Flückiger. xxiv, 364—analysis, Rosenwasser. xxvi, 188—menstruum, dil. alc. and fr. whole seed, Morris. xxix, 121—germination, Saunders. xxx, 566—removal of oil, Boerner. xxvi, 760.
Colcord, S. M. Apprenticeship. xix, 418—elixirs. xxii, 563—revision of pharmacopœia. xxiv, 637—discussions: xviii, 44, 45, 48, 50, 51, 52, 53, 54, 81, 82, 83, 94, 95, 96, 97; xxii, 498, 504, 538, 539, 540, 541, 548, 549, 563, 567; xxiii, 754, 757; xxiv, 596, 637, 643, 646, 648, 649, 668, 669, 671, 672.
Coldcream, Marshall (egg-beater). xxiv, 66—(continuous whipping). xxx, 64—Kennedy (leaves out water). xxvii, 67—Neynaber (glycerin for water). xxvii, 68—Wilder (lard oil, borax). xxvii, 68—(borax). xxiv, 66—(precip. chalk, chlorof.) xxix, 63.
 — **CUCUMBER**, Procter, Jr. xxi, 603.
 — **WITHOUT GREASE** (quince mucilage). xxviii, 44; xxix, 64.
Coolestrophane, fr. caffein, Maly and Bücheregger. xxix, 345.
Coletta-veetla—*Barleria prionitis*, India. xxviii, 125.
Coleus AROMATICUS, descript. and uses in India. Dymock. xxv, 443.
Colleges represented by delegates. xxvii, 813; xxviii, 584; xxix, 534; xxx, 672.—See also **DELEGATES**.
 — of **PHYSICIANS, PHILADELPHIA**, preamble and resolutions (poison bottles). xx, 34.
Colletia FERROX, Arg. Republ. xxx, 138.
Collidine, ident. with aldehydin, Vohl. xix, 231—relation to tropeidin and coniin, Ladenburg. xxviii, 334.
Collodion, colored by anilin colors, Springmühl. xxi, 157—best kept in cork-stoppered bottles, Markoe. xxi, 516—as printing medium, Kleffel. xxi, 157.
 — **ANTEPHELIDICUM**, Hager. xxiii, 49; xxiv, 68.
 — **CANTHARIDAL** (proport. of alc. too small), Roberts. xxv, 417—(soluble cotton) Squibb.
- Collodion (Continued).**
 xxx, 520—convenient vesicant, Gubler. xxvii, 69.
 — **CANTHARIDINATED**. xxx, 67.
 — **COTTON**, is cellulose penta-tetra-tri-di-nitrate, Eder. xxviii, 296, 7—prep. (sulph. ac., nitr. pot.) Godeffroy. xxv, 285; Klie. xxv, 286—(nitr. sulph. acids, equal parts) Mitchell. xxii, 59—pure (gun cotton; sulphurous ac., then water) Schering. xxvii, 438.
 — **ELASTIC** (castor oil) Musgiller. xviii, 271.
 — **FRECKLES**. xxiii, 49; xxiv, 68.
 — **IODINIZED**, Mattison. xxiii, 488.
 — **LEAD** (soap plaster in ether, collod.) xxvi, 93.
 — **MERCURIALE** (corros. subl.) xix, 262.
 — **SATURNINUM** (soap plast. in ether, collod.) xxvi, 93.
 — **STYPTIC** (carbol. ac., tannin, benz. ac.) xviii, 207; xxix, 64; xxx, 67.
 — **TANNATUM**. xviii, 207.
Colloturia, fr. *Simplocos racemosa*, Hesse. xxvii, 173.
Collyrium of the BENEDICTINES, Hager (soot, ac. acid). xxx, 132.
Colocynth, adult. xxx, 576; detect. of mineral adult. (chloroform). xxviii, 278—detect. in beer, Dragendorff. xxx, 339; Hoffstadt. xxii, 227; Wittstein. xxiii, 340—microscop. descript., Clark. xxv, 196—yield of pulp, Klie. xxvi, 128—difficulty of removing seeds, Maisch. xxvi, 130—used as food in North Africa, Nachtigall. xxi, 244.
Cologne, Covell. xxix, 407; xxx, 110; Ebert. xix, 163; Hager. xxiii, 118; Hoyt (probably oil Canada snakeroot). xxvi, 903; Hutin. xxiv, 689, note; Mattison. xxiii, 488; Portugal, Avery. xxvii, 124; Saunders. xxv, 418; sick-room, Leis. xxiv, 493, 687; White's, Avery. xxvii, 124.
 — use of acetic ether, Squibb. xxv, 546.
 — **ANTISEPTIC**, Fairthorne, (chloral). xxx, 110.
Colombina, by oxal. ac., Alessandri. xxx, 435—ident. with limonin, Schmidt; denied by Paterno and Ogliolero. xxviii, 347.
Colombo, adult. of powd. xxx, 576.
 — **DRAUGHT, ALKALINE** (St. Bartholomew's hospital). xxvi, 126.
 — **AMERICAN**. See **FRASERA**.
Colophalumina, Curie. xxiii, 321.
Colophonic HYDRATE, Tichborne. xix, 271.
Colophonine, Tichborne. xix, 272.
Colophonone, Tichborne. xix, 271.
Colophony. See **ROSIN**.
Colophthalin—naphthalin fr. rosin, Curie. xxiii, 320.
Colorado, pharmacy law. xxx, 475, 480.
Colorimeter (by comparison), Hager. xxx, 55; Leeds. xxvi, 83.
Colors, coloring power, Küpfer. xxiv, 382.
 — **POISONOUS** in paper (28 grs. lead to the sheet). xxi, 501.
 — **CONFECTIONERS'**, poisonous, Sharples. xxvi, 798, 9.
 — for Malaga wine. xxvi, 262.
Coltsfoot leaves, loss in drying. xxi, 202.
Columbaire—var. of olive, Italy. xxi, 217.
Columbine—*Aquilegia canadensis*, Kansas. xxix, 449.
Columbo. See **COLOMBO**.
Comandra UMBELLATA, Kansas. xxix, 451.
Combretaceae. xxv, 203; xxvii, 232.
Combustion TUBES, asbestos stopper, White. xxx, 55—point and tube separate, Keyser. xxiii, 38.
Comfrey root, loss in drying. xxi, 203.
 — **PRICKLY**—*Symphytum asperum*, Caucasus. xxvii, 165.
Commelynaceae, Kansas. xxix, 441—Mexico. xxiv, 770.
Commelina TUBEROSA, Mexico. xxiv, 770—*C. VIRGINICA*, Kansas. xxix, 441.
Committee, ADULTERAT. and SOPHISTICATION. xviii, 5—(one or three). xviii, 111—xix, 6—(chairman annually fr. a diff. city). xix, 52—xx, 5, 29, 74; xxi, 5; xxii, 5—(what it ought to do). xxii, 305—xxiii, 5, 845—(to be merged into one with committee on drug market), Diehl. xxiii, 750—xxiv, 5, 684.

Committee, ARRANGEMENT for meeting of 1876. xix, 6, 76, 95; xx, 5; xxi, 41, 50; xxiii, 5, 845.

— AUDITING. xviii, 43; xix, 50; xx, 51; xxi, 60; xxii, 497; xxiii, 779; xxiv, 599; xxv, 509; xxvi, 875; xxvii, 782; xxviii, 526; xxx, 610.

— BUSINESS. xviii, 4; xix, 5; xx, 5; xxi, 4; xxii, 4; xxiii, 4; xxiv, 4; xxv, 4; xxvi, 4; xxvii, 4.

— revision of BY-LAWS. xxiii, 5, 843.

— meeting in CALIFORNIA. xxx, 4.

— CENTENNIAL EXHIBIT. xxiv, 5, 654.

— CENTENNIAL FUND. xxv, 5; xxvi, 5; xxvii, 5, 782; xxviii, 516; xxix, 7, 512; xxx, 5.

— COUNCIL. xix, 113, xxvii, 5, 793.

— CREDENTIALS. xviii, 17; xix, 26; xx, 25; xxi, 28; xxii, 463; xxiii, 737; xxiv, 569; xxv, 473, 481, 482; xxvi, 841; xxvii, 749; xxviii, 497; xxix, 479; xxx, 582.

— ADMISSION of DELEGATES fr. GEORGETOWN School of Pharm. xx, 47.

— ADMISSION of DELEGATES fr. MICHIGAN School of Pharm. xix, 34.

— MAXIMUM DOSE. xxii, 6, 535; xxiii, 5, 814; xxiv, 5; xxv, 511.

— DRUG MARKET. xviii, 4, 21; xix, 5; xx, 4; xxi, 4; xxii, 4; xxiii, 4, 845; xxiv, 4; xxv, 4; xxvi, 4; xxvii, 4; xxviii, 4; xxix, 6; xxx, 4.

— EBERT PRIZE. xxi, 5, 72, 87; xxii, 6; xxiii, 5, 820. See also C. ON PRIZE ESSAYS.

— ELIXIRS. xx, 6, 111—(to be discontinued), Ebert. xxi, 51—xxii, 6, 573.

— ENTERTAINMENT. xxix, 6, 529; xxx, 4, 649—(suggested), Bedford. xxx, 585—(discussion), xxx, 642, 3.

— EXECUTIVE. xviii, 4; xix, 5; xx, 4; xxi, 4; xxii, 4; xxiii, 4; xxiv, 4; xxv, 4; xxvi, 4; xxvii, 4.

— ANNUAL EXHIBIT. xviii, 58, 64; xix, 43—(to be appointed at first session). xx, 41, 74—xx, 54; xxi, 53; xxii, 467; xxiii, 758; xxv, 500; xxvi, 870; xxvii, 763; xxviii, 508; xxix, 490; xxx, 600.

— J. FEHR's complaint. xxiii, 6, 845.

— FINANCES. xxvii, 782; xxix, 7; xxx, 5.

— UNOFFICIAL FORMULÆ. xviii, 5, 21—(one member). xviii, 59—xix, 6; xx, 5, 29; xxi, 4—(to be discontinued and delegated to perman. com. on pharmacopœia), Ebert. xxi, 51—xxii, 5.

— examining GENERAL INDEX. xix, 53.

— INTERNATIONAL PHAR. CONGRESS (invitation). xviii, 5, 114, 125.

— LEGISLATION. xviii, 5, 115, 124; xix, 6; xx, 5; xxi, 5; xxii, 5; xxiii, 5, 846; xxiv, 4, 684—(to be made permanent), Maisch. xxiv, 592—xxv, 4; xxvi, 4; xxvii, 4; xxviii, 4; xxix, 6; xxx, 4.

— LIEBIG MÉMORIAL. xxii, 6, 553; xxiii, 6, 846.

— LIQUOR DEALERS' LICENSE. xix, 6, 69, 87; xx, 5; xxi, 5; xxii, 5, 497.

— MEMBERSHIP. xxvii, 5, 770, 802, 803; xxviii, 4, 572; xxix, 7.

— METRICAL WEIGHTS and MEASURES. xxiii, 6, 845; xxiv, 5, 654; xxv, 5.

— NOMINATION. xviii, 21; xix, 37; xx, 35; xxi, 38; xxii, 467; xxiii, 758; xxiv, 580; xxv, 484; xxvi, 855; xxvii, 763; xxviii, 507—remarks, Squibb. xxviii, 533, 542—xxix, 488; xxx, 598.

— PAPERS and QUERIES. xviii, 4; xix, 5; xx, 4; xxi, 4; xxii, 4; xxiii, 4; xxiv, 4; xxv, 4; xxvi, 4; xxvii, 4; xxviii, 4; xxix, 6; xxx, 4.

— PERMANENT. xix, 5; xx, 4; xxi, 4; xxii, 5; xxiii, 5; xxiv, 5.

— PHARMACOPŒIA, PERMANENT. xix, 6, 124; xx, 6; xxi, 6, 92; xxii, 6; xxiii, 6; xxiv, 5—(resigns). xxv, 552.

— PHARMACOPŒIA REVISION. xxv, 5, 545, 569; xxvi, 5—(on publicat. of report). xxvii, 803.

— PHOTOGRAPH ALBUM. xviii, 21; xx, 6; xxi, 5, 87; xxii, 5; xxiii, 6, 846—(to be discontinued), Maisch. xxiv, 591.

— POWERS' DEATH. xxvi, 885.

— PRESIDENT'S ADDRESS. xviii, 39; xix, 46; xx, 44; xxi, 53; xxii, 491; xxiii, 758; xxiv, 654; xxv, 481; xxvi, 869; xxvii, 755; xxviii, 505; xxix, 486; xxx, 592.

— PRIZE ESSAYS. xxiv, 4, 684—(made standing), Maisch. xxiv, 592—xxv, 4; xxvi, 4; xxvii, 4; xxviii, 4; xxix, 6; xxx, 4. See C. EBERT PRIZE.

— PROGRESS OF PHARMACY. xviii, 4, 58, 97; xix, 5; xx, 4, 28.

Committee, PROGRESS PHARMACY, EDITORSHIP. xx, 6, 112.

— PUBLICATION of papers IN ADVANCE. xxii, 6, 535.

— PUBLICATION. xxix, 7; xxx, 5.

— REPORT PERMANENT SECRETARY. xx, 44; xxi, 53; xxii, 491; xxiii, 758; xxiv, 654; xxv, 481; xxvi, 869; xxvii, 778.

— SPECIAL. xviii, 4; xix, 5; xx, 4; xxi, 4; xxii, 5; xxiii, 5; xxiv, 5; xxv, 5; xxvi, 5; xxvii, 5; xxviii, 4; xxix, 6; xxx, 4.

— SPECIMENS, see C. EXHIBIT (ANNUAL).

— infringement of STAMP-TAX. xix, 6, 102; xx, 5, 111; xxi, 5; xxii, 5.

— STANDING. xviii, 4; xix, 5; xx, 4; xxi, 4; xxii, 4, 5; xxiii, 4; xxiv, 4; xxv, 4; xxvi, 4; xxvii, 4; xxviii, 4; xxix, 6; xxx, 4.

— letter fr. TENNESSEE COLL. PHARMACY. xxiii, 6, 845.

— TIME and PLACE. xviii, 58; xix, 70; xx, 69; xxi, 72; xxii, 523; xxiii, 814; xxiv, 654; xxv, 507; xxvi, 887; xxvii, 785; xxviii, 541; xxix, 504; xxx, 616.

— WAYS and MEANS. xxv, 5, 559.

— WEIGHTS and MEASURES. See C. METRICAL W. and M.

— WESTERN WHOLESALE DRUGGISTS' ASSOCIATION. xxx, 4, 636, 649.

— See also REPORT.

Comocladia INTEGRIFOLIA, Jamaica. xxiv, 736.

Compositae. xviii, 280; xix, 285; xxi, 223; xxii, 116; xxiii, 164, 215; xxiv, 140; xxv, 155; xxvi, 224; xxvii, 176; xxviii, 143; xxix, 156; xxx, 190.

— medicinal plants, Jackson. xxiv, 140—of California. xix, 302—Kansas. xxix, 441—Mexico. xxiv, 774.

Comptonia ASPLENIFOLIA, examin. of leaves, Chiles. xxii, 162.

Conchidia (PASTEUR'S QUINIDIA), chinoidin the most productive source, Jobst. xxiv, 351—microsulphocy. test, Hesse. xxvii, 494—prep. and prop., Hesse. xxiii, 399—formula, Jobst. xxiv, 351—solubility in chlorof., Hesse. xxiii, 406—therapeut. act., Jobst. xxiv, 350.

— See also QUINIDIA.

— and ANTIMONY TARTRATE, Jobst. xxiv, 352.

— HYDRIODATE, Jobst. xxiv, 352.

— MURIATE, Jobst. xxiv, 351.

— SULPHATE, test for purity, Hesse. xxvii, 506—prop., Jobst. xxiv, 351.

Condalia LINEATA, Arg. Republ. xxx, 138.

Condenser, (Liebig modified), Abraham. xxx, 46, 47—and retort in one, Barrett. xxx, 45—with four circular diaphragms, Borda y Barcells. xxviii, 33—improved, Hildebrand. xxiv, 60—seven-tubed, Remington. xxvi, 71—egg-shaped, Rice. xxvi, 76—upright, Squibb. xxi, 535; xxii, 46.

— "Liebig" should be "Weigel," Reichardt. xxiv, 60.

— CLEANED (am. carb.), Carles. xxix, 49.

Condurango. See CUNDURANGO.

Cones for Bunsen's pressure filter (parchment paper), Cochrane. xxiv, 54.

Cone flowers=*Rudbeckia laciniata*, Kansas. xxix, 442.

Conessi bark=*Holarrhena* (*Wrightia*) antidysenterica, India. xxiv, 724; xxx, 181.

Conessin=*Kurchicene* (of Ram Chandra). xxx, 181.

Confections, preserved (glycerin), Mordagne. xxx, 67—Ph. Brit., Haffenden. xxiii, 49.

— OPII, Ph. Brit., real strength, Shuttleworth. xxiv, 181.

— SENNÆ, U. S. '60 (modified), Ehrman. xix, 147—(cassia useless), Markoe. xxi, 516; Müller. xxv, 398—(cassia diffic. to exhaust; coriander must be good; mould prevented by oil cloves), Squibb. xxv, 548.

— SIMPLE, as a base, Haffenden. xxiii, 49.

— SULPHURIS, Ph. Brit. (addit. of tragac.), Boa. xxx, 67.

— See also ELECTUARY; PASTE.

Confectionery, adult. (terra alba; poison. color). xxiii, 522.

Conference of SCHOOLS of PHARMACY (about Tennessee College). xxiii, 829.

- Conia**, constitution (H_{17}), Hofmann. xxix, 349; xxx, 439—relation to collidin and tropidin, Ladenburg. xxviii, 334—hypodermic sol., Power. xxvii, 92—prep. (distil. conium in carb. acid gas), Kirchmann. xxv, 314, 5; (fr. seed, carb. sod., distil.), Schorm. xxx, 438—products of fractional distill., Petit. xxvi, 607—amount in ripe and unripe fruit, Schroff. xix, 276.
- **ARTIFICIAL** (fr. dibutyraldin), Schiff. xix, 228—is isomeric but not identical with the natural (paraconia), Schiff. xxi, 384—fr. methyl-conia, Michael and Gundelach. xxx, 439.
- with **BILIARY ACIDS**, Arbore. xxi, 371, 2.
- **BITARTRATE**, Schorm. xxx, 439.
- **HYDRIODATE**, Schorm. xxx, 439.
- **HYDROBROMATE**, Hofmann. xxix, 349; Schorm. xxx, 439—cryst., Mourat. xxv, 313.
- **IODIDE**, Bauer. xxiii, 428.
- **MURIATE**, Hofmann. xxix, 349.
- Coniferae**. xix, 271; xxi, 262; xxii, 163; xxiii, 228; xxiv, 203; xxv, 231; xxvi, 312; xxvii, 279; xxviii, 198; xxix, 235; xxx, 251; California. xix, 36; Kansas. xxix, 443; Mexico. xxiv, 770.
- resinous products, Morel. xxvi, 312—resins and balsams, behav. to reagents, Hirschsohn. xxvi, 453-9.
- Conioselinum UNIVITTATUM**, Japan, descript., Holmes. xxviii, 159.
- Conium LEAVES**, adult. of powd. xxx, 576—cultivat. at Hitchin, Holmes. xxvi, 206—loss in drying. xxi, 202.
- **SEED** (fruit), yield of conia, Schroff. xix, 276—uses in India, Dymock. xxvi, 162.
- Connecticut**, Pharmacy law. xxix, 376, 9; xxx, 475, 481.
- Connor, L. M.** Syr. ferri iodid. xxv, 411.
- Conocarpus LATIFOLIUS**, India. xxiv, 718—exam. of gum, Masing. xxix, 213—yield of gum. xxv, 131.
- Conquinamina**, Hesse. xxvi, 567.
- Conrath, Adam**, alc. strength of commercial fld. extr. xxx, 545.
- Conserves**, Chinese. xxii, 32.
- See **CONFECTIONS**.
- Consolida MAJOR**, loss in drying. xxi, 203.
- Constitution**, amendment. xviii, 87, 94; xxi, 37, 38—ART. I, (3d line). xxv, 9, 573; xxvi, 11; xxvii, 799—ART. I, sect. 5. xviii, 95—ART. III. xxi, 35—ART. V. xx, 86; xxi, 33, 36, 37, 73—ART. VI. xx, 86; xxi, 33, 73—about **SINKING FUND**. xx, 10; xxi, 32, 84.
- Consumption weed**=*Bahia arachnoidea*, California. xxvii, 608.
- Contrayerba**, Arg. Republ. xxiv, 762, 3—=*Flaveria contrayerba*, Chili. xxiv, 765.
- **DE JULIMES**=*Asclepias setosa*, Mexico. xxiv, 773.
- Convallamarin**. xxviii, 163.
- Convallaria JAPONICA**, Japan. xxiii, 130; xxviii, 204.
- **MAJALIS**, loss in drying. xxi, 202—therapeutic prop., Troitzky. xxx, 149.
- Convallarin**. xxviii, 163.
- Convolvulaceae**. xviii, 277; xix, 287; xxii, 108; xxiii, 152; xxiv, 135; xxv, 144; xxvi, 211; xxvii, 166; xxviii, 129; xxix, 148; xxx, 174; of California. xix, 305; Kansas. xxix, 443; Mexico. xxiv, 772.
- Convolvulin**, constitution, Kingzett and Farries. xxvi, 211—act. of solvents, Stevenson. xxviii, 129—solubilities, Köhler and Zwicke. xviii, 277.
- Convolvulus ARVENSIS**, xxiii, 156—Kansas. xxix, 443.
- **CALIFORNICUS**. xix, 305.
- **MACROCARPUS**. xxiii, 156.
- **SCAMMONIA**, see **SCAMMONY**—active principle, Kingzett and Farries. xxvi, 211.
- **SOLDANELLA**. xxiii, 156.
- Cool, Jas. H.** xxx, 657.
- Coontie-ROOT**=*Tamia integrifolia*, Florida. xxvii, 285.
- Coony**=extr. of betel nut, India, Jackson. xxiii, 128.
- Cooperative WORK** in stores, Smith. xx, 93.
- Coorta gum**, India. xxiv, 719.
- Copaiba**, see **BALSAM COPAIBA**.
- **BERRY**, China. xxiv, 743.
- Copaiba RESIN**, in mixtures (emulsify with cpd. powd. almonds), Gerrard. xxii, 67—Guy's Hospital (chlorof., alcohol, acacia). xxii, 67—(oil sweet almonds, potassa, acacia), Balckwill. xxv, 92—(milk sugar, alcohol, acacia), Greenish. xxv, 91.
- Copaiferæ**, account, Baillon. xxv, 214.
- Copaifera BIJUGA**: — **C. GLABRA**: — **C. GRANDIFLORA**: — **C. GUIANENSIS**: — **C. JACQUINII**: — **C. JUSSIEUI**. xxv, 214, 5.
- **LANGSDORFFII**. xxv, 215; xxvii, 250.
- **LAXA**: — **C. MARTII**: — **C. MULTIJUGA**: — **C. NITIDA**: — **C. OBLONGIFOLIA**: — **C. OFFICINALIS** (geographical distribut., cult. in Martinique), Baillon: — **C. PUBIFLORA**: — **C. RIGIDA**: — **C. SELLOWII**. xxv, 214, 5.
- Copal**, distinct. fr. amber, Rehoux. xxvi, 471—constitution (pyro-, schwell-, pyroschwell-, soluble, pyrosoluble-), Schwarz. xxvii, 208—behav. to reagents, Hirschsohn. xxvi, 453, 9—solubility, Sacc. xix, 310; in eucalypt. oil, Osborne. xxvii, 234—sp. gr., Hager. xxvii, 424.
- **AFRICAN**, Elton. xxiii, 229—**PERUCA** (fr. *Elaphrium copalliferum*), Mexico. xxiv, 768.
- Copernicia (Corypha) CERIFERA**, account and uses. xxiii, 129; xxvi, 183; Morgan. xxiv, 122. See also **CARNAUBA** and **WAX, CARNAUBA**.
- Copper**. xviii, 238; xix, 208; xxi, 304; xxii, 199; xxiii, 297; xxiv, 251; xxvi, 401; xxvii, 355; xxviii, 245; xxix, 269.
- act. on nitric ac., Acworth and Armstrong. xxiv, 209; xxvi, 343—allotropic modific., Schützenberger. xxvi, 401—bronze-brown color imparted, Ebermayer. xxvii, 355; xxviii, 98—fancy colors, Puscher. xix, 168—estimat., Urici. xix, 142; of small amounts (galvanic currents), Merrick. xxiv, 251—extracted fr. its ores, Hunt. xviii, 238—fr. pyrites, Nilso. xxvi, 401—absorpt. of hydrogen, Lietzenmayer. xxvi, 402—reduced by hydrogen is unsuited for analyt. purp., Fresenius. xxvi, 402—iron-plating, Boettger. xxvi, 394—oxide, decomp. by protochlor. iron. xviii, 238; temp. of reduct. by hydrogen, Müller. xix, 138—metallic powder (zinc dust), Müller and Pauly. xxvii, 297; (glucose), Stolba. xix, 208; (distill. of acct. copper), Persoz. xxvi, 243—protoxide (as subst. for pyrogallac. ac. for absorpt. of hydrog.). Kern. xxiv, 252; prep. (Fehling's test inverted), Boettger. xxi, 304—salts, act. of trimethylamin, Vincent. xxv, 315; preserve stone in moist climate, Roberts. xix, 208—tests: logwood best, Bellamy. xviii, 283; zinc-platin. element, expose deposit to brom., Cresti. xxvi, 402; hydrobrom., ac., Endemann and Prochazka. xxix, 269—test paper, Mohr. xxii, 51; guaiacum (ozone test inverted), Purgotti. xxvi, 402; xxvii, 355; xxviii, 245; limit of react. with pot. ferrocyan., ammon., pot. xanthogen., Wagner. xxx, 286.
- **NATIVE**, Belgium. xviii, 238; California. xxvii, 587; Lake Superior (1000 ton mass). xviii, 238.
- **ACETATE**, dissolves sulph. lead, Debbits. xxii, 200.
- **ALBUMINATE**, Harnack. xxix, 358.
- **AMIDOSULPHONATE**, Berglund. xxvii, 332.
- **AMMONIACAL**, solut., Boettger. xxiii, 298—possesses oxidizing action, Löw. xxvii, 356.
- **AMMON. OXYFERROCY.**, Guyard. xxvii, 321.
- **AMMONIO-SULPHATE**, fluid volume, Candidus. xxvii, 709.
- **ARSENIDE**, Deschamps. xxvii, 366.
- **BENZOATE**, heated yields salicylic acid. xxiii, 747.
- **GAMBOGIATE**, Costelo. xxvii, 210.
- **GLUCOSATE**, Salkowski; Müller; Hagen; Fileti. xxvii, 444.
- **ISOVALERIANATE**, Schmidt. xxvii, 458.
- **PHOSPHIDE**, Champion and Pellet. xxiv, 251; Schwarz. xxiv, 252.
- **PROTOCHLORIDE**, Boettger. xxii, 199; Rosenfeld. xxviii, 246.
- **OLEATE**, Wolff. xxx, 360.
- **OLEOSTEARATE**, Harlingen. xxii, 243.
- **OXYFERRO-CYANIDE** of ammoniacal, Guyard. xxvii, 321.
- **SALICYLATE**, Vulpius. xxvii, 467.
- **SUBCHLORIDE**, Hunt. xviii, 238; Heumann; Lupton. xxiii, 297.

- Copper SUBIODIDE** ("Caliche") deposit, Peru. xxiii, 246, 8.
- **SUBOXIDE**, decomp., by protochlor. iron, Hunt. xviii, 238—soluble in solut. chlor. magnes., Hunt. xviii, 238.
- **SULPHATE**, California. xxvii, 620—fluid volume, Candidus. xxvii, 709—**PENCILS**, see **CAUSTICS**—reduced by phosphorus, Sidot, xxvi, 403—solubility in alc., Candidus. xxx, 565—for tooth powder, India. xxiv, 787.
- **SULPHIDE**, comp., Thomsen. xxvii, 356—prep., Champion and Pellet. xxvi, 251.
- **SULPHO-CARBOLATE**, prep., Hustwick. xix, 251; Schering. xix, 208.
- **SULPHO-CYANIDE**, soluble in anhydrous ether, Skey. xxvi, 477.
- **TUNGSTOBORATE**, Klein. xxx, 301.
- Copperas**. See **IRON, SULPHATE**.
- Coptina**, Gross. xxi, 232.
- Coptis ANEMONÆFOLIA**, Japan. xxiii, 120; xxviii, 100; descript., Holmes. xxviii, 164.
- **QUINQUEFOLIA**. xxviii, 164.
- **THETA**, cont. 8 p. c. berberina. xxiv, 158—in India. xxiv, 724—descript., Dymock. xxvi, 164; xxviii, 164.
- **TRIFOLIA**. xxviii, 164—analysis of herb, Gross. xxi, 232.
- Copyright of common pharmaceutical names**, Pennsylv. Ph. Association. xxx, 6; 1.
- Coralillo**, Arg. Republ. xxiv, 762.
- Corallin**, coloring power, Küpfer. xxiv, 383.
- Corchorus CAPSULARIS**, India. xxviii, 89.
- **OLITORIUS**, India. xxvi, 163.
- **TRILOCULARIS**, descript. and uses in India, Dymock. xxvi, 163.
- Cordia GERASCANTHOIDES**, West Indies. xxiv, 152.
- **LATIFOLIA**, descript. and uses in India, Dymock. xxviii, 129.
- **MYXA**, India, Dymock. xxviii, 128—in Turkestan. xxi, 221.
- Cordial**, CURAÇAO, Fairthorne. xxviii, 47—Gardner. xxviii, 443—Moore. xix, 352—Valta. xxx, 74.
- **GODFREY'S**, Moore. xxx, 74.
- **LIME JUICE**. xxvii, 110.
- Coriander**, act. of sulph. ac. and alc., Doliber. xix, 444—cultivat. in Canada, Saunders. xviii, 186—in India. xxiv, 721—in Japan. xxviii, 159—germinat. of seed, Saunders. xxx, 566.
- Coriomyrtin**, physiol. action, Trojanowski. xxvi, 248.
- Coriaria RUSCIFOLIA**, New Zealand. xxiv, 737.
- **THYMIFOLIA**, juice as ink, New Granada, xxi, 258.
- Coridol**, hydrocarbon fr. wood-tar, Thenius. xxvi, 431.
- Cork**, account, Glasspoole. xxvii, 276, 7—adult. (fr. glued sheets). xxv, 513; "renovated." xxi, 502; xxii, 52—cleaned. xxi, 197; xxiv, 113.
- **LUTE** (anthracene). xix, 173.
- **PARAFFINATED**, Ruschhaupt. xxi, 198.
- **POWDER** for sore nipples, Brochard. xxvii, 278.
- **OAK**, Georgia. xxvi, 917.
- **INDIA RUBBER**, cut and bored (dip knife into caustic potassa). xxi, 198.
- Corn**, INDIAN, see **MAIZE**—**CORN SILK**, see **MAIZE**.
- **SMUT**, see **USTILAGO MAIDIS**.
- **CURE**, Gezow. xxviii, 93; xxx, 67.
- Cornaceae**, of Kansas. xxix, 443—of California. xix, 302.
- Cornin** (alkaloid), Frey. xxviii, 158.
- Cornu CABRA**, Arg. Republ. xxiv, 762.
- Cornus CANADENSIS**, California. xix, 302.
- **CIRCINATA**, analysis, Gibson. xxix, 167.
- **FLORIDA**, constituents, Frey. xxviii, 158—80 years ago. xxvi, 849—in Kansas. xxix, 443.
- **NUTTALLII**, California. xix, 302—**C. PANICULATA**, Kansas. xxix, 443—**C. PUBESCENS**, California. xix, 302.
- **SANGUINEA**, flowers cont. ferment., Kosmann. xxv, 330.
- Coronilla**, Arg. Republ. xxiv, 764.
- Corrosive Sublimate**, contamin. with arsenic, Smith. xxvi, 419—with anilin colors. xxi, 490; xxii, 308—fluid volume, Candidus. xxvii, 709—hypodermic sol., Powers. xxvii, 93—compound with muriat. ac., Ditte. xxix, 279—solubility in alc., Candidus. xxx, 565—in glycerin, Farley.
- Corrosive Sublimate (Continued)**.
xxviii, 285—reduced by sunlight, Eder. xxviii, 252—destroys fermentat. power of yeast, Petit. xxi, 400.
- Cortex MUDAR**, fr. *Calotropis gigantea*, India. xxiv, 139.
- **REMIGIA**, fr. *Remigia ferruginea*, Brazil. xxvii, 183.
- **THYMIAMATIS**, descript., Möller. xxiii, 158.
- Corvena** = *Milla capitata*, var. *pauciflora*, Arizona. xxvii, 284.
- Corvinus NIGER**, source of India isinglass. xxii, 172.
- Corvus FRUCTILEGUS**, Greece. xxvi, 312.
- Corydalin** (eclectic), solubility, Parker. xxx, 128.
- Corylus AMERICANA**, Kansas. xxix, 444.
- **AVELLANA**, buds cont. a ferment, Kosmann. xxv, 30, 330.
- Corynocarpus LEVIGATA**, examined, Skey. xxi, 263.
- Corypha CERIFERA**, see **COPERNICIA CERIFFERA**.
- Coryza SALICIFOLIA**, California. xxvii, 609.
- Coscinium FENESTRATUM**, India. xxiv, 717.
- Cosmetics**, analyzed by Chandler. xix, 349—Risser; Mitch. xxiv, 419.
- (stick pomatum). xxix, 64.
- Cosmoline**, manufact. and pharm. uses, Lemberger. xxii, 384, 507—rancidity, Markoe; Remington. xxv, 522.
- Costus** of the ancients supposed to be root of *Aplotaxis lappa*, Jackson. xxi, 224.
- = root of *Aplotaxis auriculata*, descript., etc.. Cooke. xxvii, 224.
- **Dioscorides** says that elecampane may be substit. xxvi, 227.
- **ARABICUS**; —**C. SPECIOSUS**. xxvi, 224.
- Cotarnina**, history. xxi, 373—physiol. act., Ott. xxvi, 277—prep., Mathiessen and Foster. xxiv, 345—act. of sulph. ac. and ferric chlor., How. xxvi, 560.
- Coto**. xxiv, 33—analysis, Jobst. xxv, 27, 232—constituents, Jobst and Hesse. xxviii, 200; Wittstein. xxiv, 116—descript., Harz. xxiv, 115—drug market. xxvi, 661; xxviii, 370; xxx, 472—contains piperonylic ac., Jobst and Hesse. xxvii, 281—therapeutics, Gietl. xxiv, 116.
- **FALSA**, see **PARACOTO**.
- Cotogenin** (fr. *Paracoto*), Jobst and Hesse. xxviii, 202.
- Cotoin**, Jobst. xxiv, 116, 377; xxviii, 201.
- Cotonetin** (= dicotoïn), Jobst and Hesse. xxviii, 202.
- Cotton**, detect. in linen. xxvi, 505—in contact with metallic iron, convert. into glucose and glyc., Kosmann, xxvi, 519.
- **ABSORBENT**, Slocum. xxix, 108.
- **BENZOATED**. xxix, 110.
- **BORATED**, Solger. xxvii, 120; xxix, 110.
- **BORO-CARBOLATED**, Solger. xxvii, 121.
- **CHLORINATED**, Pavesi. xxix, 108.
- **COLLODION**—, see **COLLODION COTTON**.
- **DISINFECTING**, Böttger. xix, 165.
- **GUN**—, see **GUN COTTON**.
- **HÆMOSTATIC**, Ehrle. xix, 165—Dutch Phar. Soc. xxx, 129—Cumiskey. xxi, 145—Kohland. xxi, 198.
- **IODINIZED**, Méhu. xxiv, 111.
- **IODOFORMATED**, Gerrard. xxx, 129.
- **PICRATED**, Vigier. xxv, 61.
- **SALICYLATED**. xxix, 110.
- **STYPTIC**, see **C. HÆMOSTATIC**.
- **THYMOLATED**. xxix, 110.
- Cottonroot BARK**, adult, Maisch. xxiii, 193, 500—analysis, Stæhle. xxiv, 166—Drueding. xxvi, 252—descript., Maisch. xxiii, 193.
- Cottonwood** = *Populus angulata*, Kansas. xxix, 450.
- Cotula CORONOPHOLIA**, California. xix, 303.
- Couch grass**, see **TRITICUM REPENS**.
- Coumarin**, fr. tonka, asperula, melilotus, liatris, galium triflor., Cotzhausen. xxv, 322—act. of sulph. ac. and ferric chlor., How. xxvi, 561.
- Council**. xxviii, 5; xxix, 7; xxx, 5—discussion: xix, 113; xx, 51; xxvii, 792—by-laws. xxix, 548—duties defined. xx, 36.
- committees, members, officers. xxviii, 5; xxix, 7, 503; xxx, 5.

- Council, circular to would-be members. xxx, 611—
secretary to be remunerated, Bedford. xxx, 585,
647.
- Courampoe, source of curare, Brazil. xxvi, 215.
- Covell, Thomas J. Cologne. xxix, 407—drug mill.
xx, 180.
- Cow-tree — *Brosimum galactodendron*, Venezuela.
xxvii, 274.
- Cowania MEXICANA, Nevada. xxvii, 280, 284.
- Cowdrey, Robert H. Diastase in extr. malt. xxx,
548—extr. malt. xxx, 637, 640.
- discussion. xxx, 596, 626, 632, 637, 640, 641.
- Cowhage, irritat. relieved by linim. camphoræ,
Weichselbaum. xix, 148.
- Cowri GUM, see KAURI.
- Crab apples in smallpox, China. xxiv, 757.
- Crab-orchard SALT, adult. (epsom salt, sulph.
iron). xxiii, 521—analysis, Viley. xix, 142.
- Crampbark, adult. of powd. xxx, 576.
- Cranberries, analysis (2-3 p. c. citr. ac.), Moody.
xxvii, 175—estimat. of citric ac., Ferdinand.
xxviii, 142—yield of citric ac., Wehrli. xxvi,
547.
- Cranesbill root, adult. of powd. xxx, 576.
- Cranesbill, see GERANIUM.
- Crassulaceæ. xxi, 244; xxv, 196; of Kansas.
xxix, 443.
- Cratægus COCCINEA, Kansas. xxix, 450—C. MEXI-
CANA, Mexico. xxiv, 776—C. OXYACANTHA,
Kansas. xxix, 540.
- Cratæva RELIGIOSA, descript. and uses in India,
Dymock. xxv, 194.
- Crawford, R. W. xxix, 522.
- Crayons, see CAUSTIC; PENCILS.
- Crazy weed — *Oxytropis Lambertii*, Colorado.
xxvii, 246.
- Cream, CAMPHOR-, Griffin. xxv, 83—Kraus. xxiii,
72.
- OF TARTAR, see POTASSIUM BITARTRATE.
- OF TARTAR, SOLUBLE, see TARTARUS BORAX-
ATUS.
- OF TARTAR FRUIT. xxviii, 169.
- OF TARTAR PLANT — *Osbeckia rotundifolia*,
Liberia. xxvii, 237.
- Creasote, administrat. (capsules, with tolu). Reuss.
xxviii, 285; (cod liver oil, wine), Tournier.
xxvi, 496—discussion. xx, 66; xxx, 647—dis-
tinct. fr. carbolic acid, Allen. xxvii, 417; Bed-
ford. xxx, 573; Bouchard; Gimbert. xxvi, 495;
Böttger (ferric chlor.). xxv, 279; Clarke (nitric
ac., potassa). xxi, 341; Davy (sulphomolybdic
ac.). xxvii, 416; Flückiger (ferric chlor., alc.
water). xxi, 340; Maisch (Morson's test de-
pends on glycerin cont. water). xx, 67; Read
(strong ammonia). xxii, 238; Remington (Mor-
son's test). xx, 66; Rice (Flückiger). xxi, 492;
Sander (Morson). xx, 244; Williams (Flücki-
ger; carbol. ac. react. is masked by creasot. re-
act.). xxi, 343.
- bush — *Larrea mexicana*, California. xxvii,
608.
- WOOD — *Larrea mexicana*, Arizona. xxvii,
206.
- Creatin reactions, Engel. xxx, 615.
- Credentials, see COMMITTEE, CREDENTIALS and
REPORT.
- Crème DE LYS, analysis, Risser. xxiv, 419.
- Crepis FORTIDA, flowers cont. salicylous acid. xxiii,
746.
- Crescentia ALATA, Mexico. xxiv, 773.
- Cress, SPRING-, — *Cardamine rhomboidea*;—C.,
WATER-, — *Nasturtium officinale*, Kansas.
xxix, 443.
- Creuse, J. L. A. Iron by hydrogen. xxii, 435—
iron, quantitat. determin. by gas process. xxii,
439—tasteless iron compounds. xxiii, 816.
- discussion. xxiii, 787, 793, 816; xxiv, 672, 690.
- Crinodendron HOOKERIANUM, Chili. xxiv, 765.
- Crinum ASIATICUM, descript. and uses in India,
Dymock. xxix, 127.
- Critonea DALHA, Jamaica, descript., Holman.
xxx, 153.
- Crocra PALM — *Elais guiniensis*. xix, 296.
- Crocus MINIMUS, Greece. xxvii, 144.
- SATIVUS, see SAFFRON.
- Cromyones — Onion beds, Greece. xxvii, 141.
- Crotalaria, spec. xxvii, 247.
- Croton CAPITATUM, Kansas. xxix, 445.
- DIOICUM, Mexico. xxiv, 771.
- LUCIDUM, Bahama, spurious cascarilla. xxii,
307.
- MONANTHOGYNUM, Kansas. xxix, 445.
- OBLONGIFOLIUM, India, descript. and uses,
Dymock. xxviii, 193.
- Croton chloral (HYDRATE) is really butyl-chloral,
Krämer and Pinner. xxiv, 293—administration,
Liebreich. xxiv, 293—history, prep., prop.,
Mason. xxii, 232—constitution, Krämer and
Pinner. xxvi, 273, 4—prep., prop., Krämer and
Pinner. xix, 248; Schering. xxi, 336—solut.,
Luhn. xxiii, 76—therapeut. value. xxvi, 493;
xxviii, 281.
- CYANHYDRIDE, Pinner and Bischoff. xxiv,
293.
- Crotonylen ident. with ethyl-acetylen, Prunier.
xxii, 213.
- Crown beard = *Verbesina sinuata* and *virginica*,
Kansas. xxix, 443.
- Crucibles, PLATINUM, mending, Garside. xxvii, 55.
- Cruciferæ. xviii, 289; xix, 266; xxii, 133; xxiii,
204; xxv, 194; xxvii, 224; xxix, 204; of Cali-
fornia. xix, 299; Kansas. xxix, 443.
- Cryptogams containing alumina, Church. xxiii,
126.
- Cryptomorphite, California. xxvii, 587.
- Cryptopia, history. xxi, 375—physiol. act., Ott.
xxvi, 276.
- Crystals, regular, of any desired size, Meyer.
xxvii, 61; Quin. xxvii, 61.
- Cuanchalala = *Rajania subamarata*, Mexico. xxiv,
770.
- Cuantecomate = *Crescentia alata*, Mexico. xxiv,
773.
- Cuapinole = *Hymenea courbaril*, Mexico. xxiv,
776.
- Cubebe, adult. of powd. xxx, 576—analysis,
Schmidt. xviii, 274—drugmarket. xix, 402; xx,
121; xxi, 434; xxviii, 371; xxix, 372; xxx,
466—exhausted by spir. æth. nitr., Griffin.
xxvi, 298; gasolin, Griffin. xxvi, 297—consti-
tution of camphor, Schær and Wyss. xxiii, 330;
Schmidt. xviii, 275; xxvi, 297; isomeric with
echicrin, Jobst and Hesse. xxvi, 297—acid
resin, Schmidt. xviii, 275.
- Cubebin, act. of ammon. sulpho-molybd., Buck-
ingham. xxi, 369; of nitr. ac., brom., potassa,
Weidel. xxvi, 619; of chlor. zinc., Jorisson.
xxix, 267—constitution, Schmidt. xxvi, 297—
prop., Schmidt. xviii, 275; Schulze. xxii, 165.
- Cuccubalus BACCIFERUS, sold for belladonna in
Spain. xxi, 215.
- Cuckold = *Bidens connata*, Kansas. xxix, 442.
- Cucumber, SINGLE SEED = *Sicyos angulata*, Kan-
sas. xxix, 444.
- Cucurbita MAXIMA, seeds as tæniacuge in France.
xxv, 200.
- PERENNIS, Arizona. xxvii, 229.
- See PUMPKIN SEED.
- Cucurbitaceæ. xviii, 282; xxi, 244; xxii, 145;
xxiv, 183; xxv, 196; xxvi, 278; xxvii, 228;
xxx, 235; of California. xix, 282; Kansas.
xxix, 444.
- Cucurbitin is not a glucoside, Kopylow. xxv, 200.
- Cudbear in castor oil is fluorescent, Horner. xxiii,
461—manufact. xxiii, 125.
- Culantrillo CHILENCI, Arg. Republ. xxiv, 763.
- DE POZO = *Adiantum capillus Veneris*, Arg.
Republ. xxiv, 764.
- Culé, Arg. Republ. xxiv, 763, 4.
- Culen = *Psoralea glandulosa* and *bituminosa*, Chili.
xxiv, 765, 6.
- Culexifuge. xxiv, 827.
- Culver's ROOT, adult. of powd. xxx, 576.
- Cuminol, act. of alc. potassa, Meyer. xxvi, 445.
- Cummings, R. T. Mortar practice. xxiii, 588.
- Cumol in Pennsylvania petroleum, Engler. xxviii,
259.
- Cundurango, analysis, Antisell. xix, 308—in can-
cer. xxx, 126—drug market. xx, 120; xxi, 435—
"Ecuador" is more agreeable than "Venezu-
ela," Hoffmann. xxx, 127.
- Cupayba = *Copaiva*. xxv, 214.
- Cuphea LANCEOLATA, Mexico. xxiv, 776—C. VIS-
COSISSIMA, Kansas. xxix, 448.

- Cup plant**—*Silphium perfoliatum*, Kansas. xxix, 442.
- Cuprea BARK**, see CINCHONA CUPREA.
- Cupressus FRAGRANS**;—*C. LAUSONIANA*;—*C. MACROCARPA*, California. xxvii, 600.
- *PYRAMIDALIS*, analysis, Harsden. xxv, 231.
- Cupric**—See COPPER.
- Cuprocyanides**, Vidau. xxiv, 232.
- Cuprous**—see COPPER, PROTO-
- Cuprum**, see COPPER.
- Cupuliferæ**. xviii, 276; xxii, 162; xxv, 230; xxvi, 312; xxvii, 275; xxviii, 197; of California. xix, 306; Kansas. xxix, 444.
- Curare**. xxvi, 32—account, Flint. xxix, 152; Moss. xxvi, 214—plants (four distinct regions, each diff. plants) Planchon. xxviii, 137; xxix, 150, 152—is more active than curarin (=Preyer's sulph.), Sachs. xxviii, 137—drug market. xxv, 352—hypodermic sol., Powers. xxvii, 93—preparation, Jobert. xxvi, 215—variable quality, Blodgett. xxvii, 170.
- Curarin**, act. of arseniate of sodium, Tattersall. xxviii, 324—isolated by carbol. ac., Salomon. xxi, 340, 383—distinct. fr. strychnine, Flückiger. xxii, 272—"Preyer's sulphate" is calc. phosph. and calc. carb., Sachs. xxvi, 590; xxviii, 137.
- *ACETATE*, behavior to reagents, Sachs. xxvi, 591.
- *SULPHATE* ("Preyer's") is phosph. and carb. calc., Sachs. xxvi, 590; xxviii, 137.
- Curcas PURGANS** cont. an alcohol ident. with caprylic alc., Silva. xix, 293.
- Curculigo ORCHIOIDES**, India. xxix, 128.
- *UNCIFOLIA*, India, descript. and uses, Dymock. xxix, 128.
- Curcuma SATIVA**, see TURMERIC.
- *ZEDOARIA*, see ZEDOARY.
- *ZERUMBET*, Japan, descript., Holmes. xxviii, 114.
- Curcumin**, Daube. xix, 294; Jackson. xxx, 448.
- Curdy SEEDS**—fr. *Carthamus tinctorius*, India. xxiv, 722.
- Currant, AUSTRALIAN**—*Leptomeria acida*. xxx, 154.
- Currants** (Corinthian raisins) collect. and preparation, Greece, Landerer. xxv, 186.
- *INDIAN*—*Symphoricarpus vulgaris*, Kansas. xxix, 441.
- Curry POWDER**. xxviii, 93.
- Curtman, Chas. O.*, pharmaceut. still. xix, 117.
- discussion: xix, 117, 118, 119.
- Cusconin**, in Cuprea bark, Hesse. xxx, 203—ident. with cinchonidia, aricina, cinchovatina, Hesse. xxv, 29, 305—prop., Hesse. xxvi, 569.
- Cusconidia**, prop., Hesse. xxvi, 569.
- Cuscuta EPILINUM**, Greece. xxiv, 135.
- Cuttle-fish POWDER**, Piesse. xxiii, 117.
- See *OSSA SEPIA*.
- Cyanides**, ALKALINE, formation and production, Adler. xxix, 253—antidote (oxysulphide iron, magnesia) Nietsch. xxix, 86.
- Cyanoform**, Pfannkuch. xxi, 333.
- Cyanogen**. xviii, 260; xxi, 286; xxiii, 262; xxiv, 232; xxv, 251; xxvi, 367; xxvii, 317; xxviii, 232; xxix, 253; xxx, 285.
- *BROMIDE*, detect. in bromine, Phipson. xxii, 179.
- *IODIDE* in iodine, Semenoff. xix, 189.
- Cyanon** is explosive, Thompson. xxvi, 364, 6; xxviii, 254.
- Cyanophyll** (of Kraus) is pure chlorophyll, Wiesner. xxiii, 455.
- Cyathes SMITHII**, source of pinghwar-djambe, India. xxii, 98.
- Cyblastax ANTISYPHILITICA**, Brazil. xxvii, 166; xxx, 177.
- Cycadeæ**. xxvii, 280.
- Cyclamen, EUROPÆUM**, Greece. xxv, 134.
- Cyclamin** as substit. for curare in tetanus, Luca. xxv, 316.
- Cyclopia BRACHYPODA**, South Africa, microscop. descript. and analysis, Greenish. xxix, 217, 220.
- *GENISTOIDES*, South Africa, descript., Jackson. xxii, 149; Greenish. xxix, 217.
- *LONGIFOLIA*, South Africa, microscop. descript. and analysis, Greenish. xxix, 217, 8, 9.
- *VOGELII*, analysis, Church. xix, 308; xxix, 221.
- Cyclopin** fr. *Cyclopia longifolia*, Greenish. xxix, 220—fr. *Cyclopia Vogelii*, Church. xix, 308; xxix, 221.
- Cyclopio-fluorescin**, Greenish. xxix, 220.
- Cydonia VULGARIS**, Greece. xxvii, 241.
- Cymen** fr. oil turpentine, Barrier. xxi, 118.
- Cymenes**, examined, Wright. xxiii, 319—fr. various sources are identical, Beckett and Wright. xxiv, 269.
- Cynapin** fr. *Æthusa cynapium*, Ficinus and Bernhardt. xxviii, 160.
- Cynara SCHOLYUM**, Greece. xxvi, 230.
- Cynips SALVIE**, Greece. xxix, 141.
- Cynoglossum GRANDE**, California. xix, 304—*C. MORRISONI*, Kansas. xxix, 440.
- *OFFICINALE*, extract acts like curare, Diedulin. xix, 289—in Kansas. xxix, 440.
- Cynoglossina**, Buchheim. xix, 289.
- Cyperaceæ**. xxix, 120—of Kansas. xxix, 444; Mexico. xxiv, 769.
- Cyperus ARTICULATUS** (Adrue) Jamaica. xxiv, 734.
- *PERTENUIS*, India. xxix, 120.
- *ROTUNDUS*, India, descript. and uses, Dymock. xxix, 120—in Mexico. xxiv, 769.
- Cyphomandra BETACEA** yields citric acid. xix, 220.
- Cypripedin** (eclect.) solub., Parker. xxx, 128.
- Cypripedium ACAULE**, analysis, Bryan. xxiii, 138.
- *CALIFORNICA*. xix, 307.
- *PUBESCENS*, possesses poisonous prop., Babcock. xxiii, 137—adult. (hydrastis). xxi, 479; xxx, 576—in Indiana. xxviii, 502; Ohio. xxviii, 503.
- *SPECTABILE*, poisonous, Babcock. xxiii, 137.
- Cypress, MONTEREY** = *Cupressus macrocarpus*. xxvii, 600.
- Cystodemus ARMATUS**, Saunders. xxiv, 507.
- Cytisina**, Husemann. xviii, 267.
- *NITRATE*, Husemann. xviii, 267.

D.

- Dabane-hindi** = *Mylabris cichorei*, Persia. xx, 249.
- Dactylis GLOMERATA**, ergot, Wilson. xxiv, 120.
- Dad** = *Poa cynosuroides*, India. xxvi, 161.
- Dad-mari** = *Ammania vesicatoria*, India. xxvii, 237.
- Dad-murdun** = *Cassia alata*, India. xxv, 211.
- Dæmia EXTENSA**, India, descript. and uses, Dymock. xxv, 151.
- Dagutt**—Birch tar. xxix, 234.
- Dai-bushi**—a spec. of aconite, Japan, descript., Langgaard. xxix, 175—yield of extract. xxix, 182.
- Daikonso**—*Geum Japonicum*, Japan. xxviii, 180.
- Dakrya-elattopissa**—resin fr. fir cones, Greece. xxix, 236.
- Dalbergia SYMPATHETICA**, India, descript. and uses, Dymock. xxvi, 159.
- Dalea CITRIODORA**, Mexico. xxiv, 776.
- *EMORYI*;—*D. POLYADENIA*, California. xxvii, 258.
- Dalrymple, Chas. H.*, report on exhibit. xxviii, 375.
- discussion: xix, 30, 31, 32, 66, 68, 102, 107, 109, 110.
- Dambonite**, fr. Gaboon caoutchouc, Girard. xxii, 249.
- Damiana**. xxiv, 37—account, Caldwell. xxiii, 229.
- commercial varieties, Lloyd. xxix, 206; Wellcome. xxiv, 185—analysis, Parsons. xxix, 206.
- discussion. xxiv, 679—drug market. xxv, 352; xxvi, 661; xxviii, 371; xxix, 372—cont. chloride pot., Wayne. xxiv, 186—therapeutic value, Menninger. xxvi, 881.
- *Turnera aphrodisiaca*, California. xxvii, 608; *Aplopappus discoideus*, Mexico. xxiv, 774.
- Damarra AUSTRALIS**, see KAURI GUM. xxiii, 228.
- Dammar**, behavior to reagents, Hirschsohn. xxvi, 453, 9—solubilities, Sacc. xix, 310; in eucalyptus oil, Osborne. xxvii, 234—spec. gr., Hager. xxvii, 424.
- *BLACK*, fr. *Canarium strictum*, India. xxiv, 196, 718.
- *SAL*, fr. *Shorea robusta*, India. xxiv, 718.

- Dana, Jr., Edmund*, boric acid. xxx, 553.
Dandelion, AMERICAN—chicory. xxii, 307.
 — see TARAXACUM.
Daniels, Thomas. xx, 79.
Daphne MEZEREUM, see MEZERION.
Daphnopsis SALICIFOLIA, Mexico. xxiv, 771.
Darbh—*Poa cynosuroides*, India. xxvi, 161.
Darby's PROPHYLACTIC FLUID. xviii, 214.
Darchini—bark of *Cassia lignea*, India. xxvi, 163.
Darhalad—wood of a species of berberis, India, descript., Dymock. xxvi, 164.
Darunaj-i-akrabi (Persian)—*Doronic scorpioides*, India. xxviii, 149.
Daruri—*Argemone mexicana*, India. xxv, 194.
Daryai—kernels of *Lodicea Seychellarum*, India. xxvi, 162.
Dasamula kvatha (a medical preparation), India. xxviii, 120.
Dates and their uses in the Orient, Landerer. xxv, 124—stones for adult. coffee. xxvii, 138.
 — BLACK and RED. China, fruits of *Rhamnus utilis* and *Rh. chlorophorus*. xxv, 235.
 — TREBIZONDE (= *Elæagnus hortensis*), for adult. "churtus," Jackson. xxi, 261.
Datura ALBA, India. xxiv, 725; descript., Dymock. xxviii, 123—Japan. xxviii, 100; descript., Holmes. xxviii, 124.
 — FASTUOSA, India, descript., Dymock. xxviii, 123.
 — METELOIDES, California. xxvii, 158.
 — STRAMONIUM, Japan. xxviii, 124—Kansas. xxix, 451.
 — TATULA, Kansas. xxix, 451.
Datura, ident. with atropidin, Regnault and Valmont. xxx, 422.
 — "LIGHT" ident. with hyoscyamia, Ladenburg. xxviii, 336; Merck. xxx, 422.
 — "VERUM" or "HEAVY," ident. with atropin, Merck. xxx, 422; denied by Pöehl. xxvi, 591; xxvii, 508—is a mixture of atropin and hyoscyamin, Ladenburg. xxviii, 336—act. of fuming nitr. ac. and pot., Vitali. xxix, 336; xxx, 423—microsublimat. point, Blyth. xxvii, 483—solubl. in alc., Lafean. xxix, 324.
 — PLATINOCHLORIDE, Schmidt. xxix, 335.
Daucus CRINITUS, Morocco. xxiv, 114.
 — PUSILLUS, California. xix, 302.
Dauna—*Artemisia indica*, India. xxviii, 144.
Davalia TERMINIFOLIA, Mauritius. xxiv, 741.
Davenport, B. F., glycerin, estimation. xxix, 524.
Davra—*Conocarpus latifolius*, India. xxv, 131.
Davyum, Kern. xxvi, 429.
Dawara—*Conocarpus latifolius*, India. xxv, 131.
Dayflower—*Commelina virginica*, Kansas. xxix, 441.
Death, APPARENT, atropia as a mydriatic test, Deboux. xix, 229.
Decanting JAR, Gawalowski. xxiii, 36.
Decipia, equivalent and spectrum, Delafontaine. xxvii, 343.
Decipium, Delafontaine. xxvii, 342.
Deckanee hemp—*Hibiscus cannabinum*, India. xxiii, 192.
Decoction, addit. of ALKALIES and their salts promotes extract. of veget. drugs, Blackwell. xxvii, 70.
 — CHINESE. xxii, 33.
 — fr. FLUID EXTRACTS, Saunders. xxvii, 710.
 — PRESERVED, Almén (cotton). xxiii, 68; Barnes, (chloroform). xxiii, 68.
 — ALOES COMP., loss of bitterness due to act. of alkali on aloin, Tilden. xix, 144.
 — CHIMAPHILA, fr. fld. extr. (satisfactory) Saunders. xxvii, 712.
 — CINCHONA (addit. of mur. ac.), Broeker. xxv, 67—fr. fld. extr. (satisfactory), Saunders. xxvii, 713.
 — CORNUS FLORIDA, fr. fld. extr. (satisfactory), Saunders. xxvii, 713.
 — DULCAMARA, fr. fld. extr. (satisfactory), Saunders. xxvii, 713.
 — LAMINARIA SACCHARINA, Wheeler. xxx, 70.
 — OLD COCK, China. xxvi, 843.
 — QUEBRACHO, Burgos. xxviii, 46.
 — SALEP (lumps prevented by alcohol), Depaifve. xxiii, 70.
Decoction, SARSAPARILLA COMP., fr. fld. extr. (satisfactory), Saunders. xxvii, 713.
 — SENEGA, fr. fld. extr. (satisfactory), Saunders. xxvii, 713.
 — UVA URSI, fr. fld. extr. (satisfactory), Saunders. xxvii, 714.
Decolorizing POWDER (clay, blood, etc.), Pfandler. xxix, 43.
Dee-oh—*Rehmannia lutea*, Japan. xxviii, 204.
Deer tongue, see LIATRIS ODORATISSIMA.
 — —Erythronium spec., use by Indians. xxi, 621.
De Forrest, W. P. On nomination. xxviii, 559.
 — discussions. xxviii, 559, 565.
Degutt—Birch tar. xxix, 234.
Deilephila NEREI, attacks cinchona in isle of Bourbon. xxiv, 146.
Dekamali GUM, fr. *Gardenia lucida*, analysis, Stenhouse and Groves. xxvii, 272; Flückiger. xxv, 163.
Delegates admitted: xviii, 18; xix, 28, 46; xx, 27; xxi, 33, 72; xxii, 464, 495, 535, 537; xxiii, 751, 799; xxiv, 576, 578, 597; xxv, 482, 500; xxvi, 853, 870; xxvii, 756, 805; xxviii, 506, 513; xxix, 487, 493; xxx, 593, 630.
 — to Centennial meeting of Am. Ac. Sci. and Arts. xxviii, 498.
 — definition of who is to be admitted and who not. xx, 71—to pay initiation fee. xxv, 526.
Delirium (chloral and morphia), Kühn. xxi, 335.
Delphinia extract, by coal oil, Boiraux and Léger. xxiii, 428—microsublimating point, Blyth. xxvii, 483—act. of zinc chloride, Jorisson. xxix, 267.
Delphinium CALIFORNICUM;—D. NUDICAULE, California. xix, 298.
Dendrobium CERRAIA, China. xxiv, 746.
Dendromecon RIGIDUM, California. xix, 299.
Denmark, chemicals, Centennial exhibit. xxiv, 796.
Dentifrice, Betton. xxiii, 116.
 — salicylic ac. and charcoal objectionable, Suerssen. xxviii, 92.
 — see TOOTH POWDER.
Dentine, ARTIF., formation fr. lactophosph. calc. xxvi, 544.
Depilatory POMADE. xxx, 66.
 — POWDER. xxvii, 123.
Depressaria ONTARIELLA, attacks dill, Saunders. xviii, 186.
Dernone—*Meloe tucius*; *Mylabris tenebrosa*, Arabia. xxvii, 286.
Desiccator for bisulph. carb; ether; chlorof.; benzol=(paraffin), Liebermann. xxviii, 37.
 — see also DRYING.
Desmodium CESPITOSUM, Mauritius. xxiv, 741.
Desoxycodala, history xxi, 374.
Desoxymorphia, history. xxi, 373.
Deuteropin, history. xxi, 375.
Devil's dye=Indigo. xxiv, 714.
Deweya ARGUTA;—D. HARTWEGII;—D. KELLOGGII, California. xix, 301.
Dextrin, adult. xxx, 576—combination with alkalis, Pfeiffer and Tollens. xxx, 366—analysis, Forster. xviii, 268—formula, Pfeiffer and Tollens. xxx, 366—detect. in gum arabic, Hager. xxii, 153—free from glucose, Boudonneau. xxiii, 360—impure (86 p. c. insoluble matter), Forster. xix, 259—insoluble, Musculus. xix, 259—manufact. fr. potatoes by fluosilicic ac., Anthon. xxiv, 313; fr. glucose, Musculus. xxx, 376; fr. starch by carbonic ac., Bachet and Lavallo. xxvii, 440—purified, Hager. xviii, 268; xix, 259; Jassoy. xix, 145—undergoes alcohol. ferment. with yeast alone, Barford. xxi, 358—in diabetic urine, Reichardt. xxiii, 473.
 — GLOBULISÉE, Musculus. xxiii, 359.
 — MALTOSE-, fr. rice, Valentin. xxvi, 518. See also STARCH SUGAR.
Dextrose=glucose, (England.) xxix, 519—fr. maltose, Meisel. xxx, 377.
Dhalakura—rootbark of *Alangium Lamarkii*, India. xxvii, 237.
Dhatooora=*Datura alba*, India. xxiv, 725.
Dhatureas=poisoners in India. xxviii, 124.
Dhawa=flowers of *Grislea tomentosa*, India. xxiv, 718.
Dhera—rootbark of *Alangium Lamarkii*, India. xxvii, 237.

- D'hobies' earth**—impure carbon. soda, India. xxiv, 786.
- Dhoe**—"washings" fr. jars and vessels of opium in India. xxiv, 727, 9.
- Dhoop**, resin, fr. *Vateria indica*, India. xxiv, 718.
- Dhustura**—*Datura alba*; *D. fastuosa*, India. xxviii, 123.
- Diabetes**, glycerin lemonade, Schulze. xxi, 171.
- weed—*Actinomeris helianthoides*, uses in Georgia. xxix, 160.
- Diabrotica DUODECIMPUNCTATA**. xxvii, 178.
- Diacetyl-PSEUDACONIA**, Wright and Luff. xxvii, 510.
- Diathermalysis**, Legrip. xxiv, 28, 61.
- Diac.**—See also **DIAC.**
- Di-allyl-ETHYL-ALCAMINE**, Ladenburg. xxx, 399.
- Dialysis**. xxvi, 55—act. of bladder and parchment-paper, Wöllmer. xxx, 37—doubling and trebling parchment paper. xxx, 37—parchment paper bags, Huizinga. xxvii, 91.
- Diamonds**, grey and blue decolorized, Biballier. xxvii, 316—p. gr., Kopp xxiii, 260—Australia. xix, 181—California. xxvii, 596.
- ARTIFICIAL, Hannay. xxviii, 230—Mactear. xxviii, 230—Marsden (silver and sugar carbon). xxx, 282.
- BLACK, Brazil. xxii, 184.
- Dianthera AMERICANA**, Kansas. xxix, 439.
- Diarrhoea MIXTURE**, Close. xix, 488—Squibb. xxii, 342.
- Diastase**, is merely an altered product containing accidentally maltin, Dubrunfaut. xxviii, 363—act. of acid and alcohol, Kjeldahl. xxx, 455—estimat., Dunstan and Dimmock. xxvii, 544; Cowdrey, xxx, 548—found chiefly in cellular tissue beneath epidermis, Urban. xxii, 286—incompatible with acid and pepsin, Scheffer. xxiv, 551—power to convert starch into sugar destroyed by borax, Dumas. xxi, 400—for extinguishing mercury. xxix, 62—prep., Perret. xxiii, 467; xxv, 330—saccharifying power, Dubrunfaut. xxviii, 363—act. upon starch promoted by carbonic ac., Baswitz. xxvii, 543; Petit. xxiv, 313—therapeutical value, Hunt. xxii, 468.
- Diastatic FERMENT** in egg-albumen, Selmi. xxx, 456.
- Diatomaceous EARTH**, California. xxvii, 588—Richmond. xxi, 101.
- Dibenzoyl-APOSEUDACONIA**, Wright and Luff. xxvii, 510.
- HYDROCOTONE, Jobst and Hesse. xxviii, 203.
- Dibrom-METHANE**, Damoiseau. xxix, 296.
- Dichlor-ALLYLEN**. xxvi, 475.
- ETHYLEN CHLORIDE, Taube. xxix, 293.
- ETHYLIDEN CHLORIDE, Taube. xxix, 293.
- HYDRIN, Claus. xxii, 241—for making citric acid, Grimaux and Adam. xxix, 319.
- Dichlor-METHANE**, Damoiseau. xxix, 295.
- Dichloro-PROPIONITRIL**, solid, Backunts and Otto. xxvi, 533.
- Dicinchnonia**, Hesse. xxvi, 566.
- Dickey**, G. S. Letter about his paper on practical notes. xix, 41.
- Diconchlinia**—chiefly chinoidin, Hesse. xxvi, 566; xxix, 333.
- Dicotoin**—cotonetin, Jobst and Hesse. xxviii, 202.
- Dictamnus CRETICUS**, Greece. xxiv, 159.
- Dictamo**, REAL—*Passiflora dictamnus*, Mexico. xxiv, 775.
- Didelphis CANCRIVORA**, Brazil. xxvi, 216.
- Didymium**. xxiii, 284; xxv, 256; xxvii, 340—not a simple body, Delafontaine, xxvii, 340—prop., Hillebrand and Norton. xxv, 256—fr. samarskite and fr. cerite; comp. and spectrum, Delafontaine. xxvii, 343, 5—fluorescence of salts, Soret. xxvii, 346.
- NITRATE;—D. OXIDE;—D. OXYCHLORIDE;—D. SESQUIOXIDE;—D. SULPHATE, Frerichs. xxiii, 285, 6.
- Diehl**, C. L. Acid salicylic, review. xxiii, 745—Annual address. xxiii, 737; inaugural address. xxii, 493—ammonia apparatus. xix, 518—classification in report progr. of pharmacy. xxi, 418—committees on drug market and on adulteration to be merged into one. xxiii, 750—digitalis alkaloids, review. xxiii, 742—indigenous drugs xviii, 137—chloral hydrate. xxi, 89—elixirs. xxiv, 28—fluid extracts, report for pharmacop. revis. xxvi, 681; xxvii, 727; xxviii, 424, 550—heat in fluid extracts. xix, 115—fluid-extract. sarsaparill. co. xxi, 100—jaborandi, review. xxiii, 739—liquor magnesii citr. xix, 105—phosphorated oil. xxiv, 627—percolation and percolators. xxvii, 728—rejection of unsuited papers. xxiii, 750—report on exhibit. xix, 375—on report progress pharm. xxii, 550—report on progress of pharmacy, since: xxi, 151—saturations. xxvii, 733—Seidlitz powder. xx, 89—solubilities. xxx, 622—suppositories. xxiv, 31.
- discussions: xix, 92, 105, 106, 108, 115, 124; xx, 28, 76, 77, 89, 90, 98, 101, 102, 103; xxi, 44, 66, 73, 74, 78, 83, 89, 92, 100, 103; xxii, 493, 498, 506, 510, 518, 550, 564; xxiii, 753, 754, 756, 757, 834; xxiv, 605, 627, 672; xxv, 528, 531, 550, 551, 552, 559; xxvii, 796, 805; xxviii, 551, 552; xxx, 622, 645, 666.
- Diethyl-CARBINOL**. xxvii, 412.
- Digenia SIMPLEX**, Japan, descript., Holmes. xxviii, 101.
- Digerentia**, Elmer. xxv, 114.
- Digesting APPARATUS** ("Norwegian kitchen") Meyer. xxix, 51.
- Digestion QUEBRACHO**, Burgos. xxviii, 46.
- Digestive FERMENTS**, Roberts. xxviii, 360.
- Digitalein**, represents digitalis best; ident. with Walz' digitasolin, Goerz. xxii, 277.
- Nativelle. xxiii, 744.
- Schmiedberg. xxiii, 445, 7.
- Digitaletin**, Walz. xxiii, 743, 5.
- Digitalin**, account and history, Diehl. xxiii, 743—act. of arseniate sod., Tattersall. xxviii, 724—act. of bichrom. mixt., chlorin lime, Hamlin, Jr. xxix, 324; of sulph., and phosph. ac., Flückiger. xxi, 388; of sulphomolybdate ammon., Buckingham. xxi, 369; of chlor. zinc, Jorisson. xxix, 267—is a product of manipulation and not a natural alkaloid, Kosmann. xxiii, 442—physiolog. act., Daremby. xxi, 389—prep. German process. xxiii, 443; Goerz. xxii, 277; Nativelle. xxiii, 441—test (sulph. ac., oxgall) Brunner. xxii, 278—yield fr. parenchym and fr. midrib, Nativelle. xxiii, 149.
- AMORPHOUS, Nativelle. xxiii, 744.
- CRYSTALLIZED, Nativelle. xxiii, 744.
- of: Homolle; Kosmann; Labourdais; Lancelot; Nativelle. xxiii, 743, 4; Schmiedberg. xxiii, 445, 446; Walz. xxiii, 743, 745.
- Digitaliresin**, Schmiedberg. xxiii, 447.
- Digitalis**, adult. (*Inula conyza*). xxix, 137; of powd. xxx, 576—alkaloids, Diehl. xxiii, 742—chemical history, Ludwig. xix, 291—season for collect. xxix, 136; Bernbeck. xxviii, 119; Maisch. xxi, 623, 4; Nativelle. xxiii, 148; Schneider. xviii, 276—cultivat. in Canada, Saunders. xviii, 185; in Ootacamund. xxix, 115; in Spain. xxv, 368—loss in drying. xxi, 202—cont. a ferment, Kosmann. xxv, 134, 330—germinat. of seeds, Saunders. xxx, 566—causes of diff. in quality. xxix, 136—test for quality (ferroc. pot.) xxix, 137.
- Digitalretin**. xxiii, 443; Kosmann. xxiii, 743, 5.
- Digitasolin**, Walz. xxiii, 743, 5.
- Digitin**, xxiii, 441, note; is a glucoside, Goerz. xxii, 277—Nativelle. xxiii, 744, 5.
- Digitogenin**, Schmiedberg. xxiii, 446.
- Digitonein**, Schmiedberg. xxiii, 445.
- Digitonin**, Schmiedberg. xxiii, 445.
- Digitoresin**, Schmiedberg. xxiii, 445.
- Digitoxin**, Schmiedberg. xxiii, 444.
- Dihepten**, fr. rosin, Renard. xxix, 287.
- Dihomocinchonia**, Hesse. xxvi, 567.
- Di-iodhydrin**, Claus. xxii, 241.
- Di-Iso-amylen**. xxx, 344.
- Dika**, fat fr. *Irvingia Barberi*, Africa. xxix, 116.
- Dikamali**—*Gardenia gummifera*; *G. lucida*, India. xxv, 163—analysis of resin, Flückiger. xxv, 163; Stenhouse and Groves. xxviii, 272.
- Dilatometer**, Pile. xxix, 34.
- Dill**, cultivat. in Lincolnshire, Holmes. xxx, 208.
- INDIAN—*Anethum Sowa*, India. xxiv, 721.
- Dill**, J. B. Address of welcome at Indianapolis. xxvii, 746.

- Dill*, J. B. Discussion. xxvii, 758, 9.
- Di-mercur-ammonium, SELENATE**, Cameron and Davy. xxx, 263.
- Di-methyl MORPHIA**, Hesse. xxx, 402.
- Di-methyl-NOR-NARCOTIA**, history. xxi, 373.
- Dinduga**=*Conocarpus latifolia*, India. xxiv, 718.
- Bi-nitrocellulose**, Wolfram. xxvii, 437.
- Dioscorea QUINQUELOBA**, Japan. descript., Holmes. xxviii, 111.
- **JAPONICA** descript., Holmes. xxviii, 111.
- **VILLOSA**, adult. xxx, 577—descript., Maisch. xxvi, 190—therapeutic value. xxix, 128—in Kansas. xxix, 444—in Ohio. xxviii, 503.
- Dioscoreaceae**. xix, 268; xxvi, 190; xxviii, 110; xxix, 128; of Kansas. xxix, 444; of Mexico. xxiv, 770.
- Dioscorides**. xxv, 476.
- Diosma ALBA**, Cape of Good Hope. xxiv, 738.
- Diosphenol**, fr. oil of buchu, Flückiger. xxix, 288.
- Diospyros KAKI**, China. xxv, 235—in India, Dy-mock. xxiv, 139.
- **VIRGINIANA**, Kansas. xxix, 444.
- Dioxethyl-METHYLENE**, Greene. xxix, 298.
- Diphenylamin** as test for nitric acid. xxx, 472.
- Diphtheria** (sulphite magnesias), Schottin. xxiii, 77.
- Di-piper-ALLYL-ALCAMINE**, Ladenburg. xxx, 399.
- Dipteraceae**. xxiii, 216; xxiv, 172; xxvi, 268.
- Dipterocarpus LAEVIS**, India, Hanbury. xxiii, 217.
- Dipteryx EBOENSIS**, Mosquito Coast. xxvi, 292.
- **ODORATA**. xxvi, 292. See also **TONKA**.
- Discussions and MINUTES**, difference, Judge. xxiv, 667.
- Discussions: ACONITE**, poisoning (McCollin, Procter, Squibb). xviii, 77.
- **committee on ADULTERATION** (Ebert, Shinn, Squibb). xviii, 111.
- **ADULTERATIONS** (Brady, Ebert, Markoe, Procter, Remington). xix, 59.
- **report on ADULTERATION** (Eberbach, Markoe, Robbins, Sharples, Squibb). xxiv, 650.
- **appointment of AGENTS**. (Ebert, Haviland, Maisch, Sargent, Shinn, Squibb). xviii, 113.
- **ALCOHOL**, buying and selling (Markoe, Pile, Squibb). xxi, 70.
- **ALKALOIDAL solut.**, preserving (Bullock, Hancock, Maisch, Remington, Squibb). xxi, 96.
- **APOCYNUM androsæmitol**, and *A. cannabinum* (Lloyd, Maisch, Saunders). xxix, 516.
- **report of committee on ARRANGEMENT for 1876** (Diehl, Ebert, Markoe, Procter, Squibb). xxi, 66—(Eberle, Hancock, Judge, Maisch, Menninger, Saunders, Sheppard, Vogelbach). xxiv, 572.
- **meeting at ATLANTA** (Baker, Ebert, Heinitsh, Ingalls, Menninger, Saunders). xxv, 507—(Bro-ford, Cassebeer, Ebert, Eberle, Ingalls, Kennedy, Maisch, Menninger, Remington, Sheppard, Shinn, Squibb, Tarrant). xxv, 515, 6, 7, 8.
- **BANQUETS** (Markoe, Menninger, Remington, Saunders, Seabury). xxx, 661.
- **BENZIN** as menstruum (Maisch, Remington), xxii, 536.
- **BERBERINA** (Kennedy, Lloyd, Maisch, Menninger). xxvi, 892.
- **BLUE MASS POWDER** (Balluff, Ebert, Hancock, Maisch, Moore, Pile, Ramsperger, Remington). xxii, 526.
- **BORIC ACID** (Cool, Eliel, Kennedy, Maisch, Markoe, Remington, Rosenwasser, Saunders, Sloan, Squibb). xxx, 656.
- **BOSTON meeting 1875** (Colcord, Ebert, Hancock, Maisch, Remington, Saunders). xxii, 538.
- **BY-LAWS**, chapt. III, art. I. (Coddington, Colcord, Ebert, Maisch, Procter, Shinn, Squibb, Taylor). xviii, 51—chapt. VI, art. VI; chapt. VII, art. III (Balluff, Bullock, Maisch, Squibb). xxi, 30—chapt. VII, art. II (Ebert, Menninger, Remington, Roberts, Squibb). xxviii, 542—chapt. VII, art. III (Colcord, Maisch, Murray, Squibb). xviii, 94—chapt. VIII, art. II (Baker, Bedford, Ebert, Maisch, Moore). xxii, 543.
- **CONSTITUTION and BY-LAWS**. (Colcord, Maisch, Procter, Sargent, Tufts.) xviii, 87.
- **CACHETS DE PAIN** (Judge, Painter, Saunders, Wellcome). xxiv, 682.
- **CALIFORNIA meeting** (Bullock, Cowdrey, Gordon, Roberts, Sheppard). xxx, 631.
- Discussions: CANTHARIDAL COLLODION** (Saunders, Shinn, Squibb). xxv, 520.
- **CANTHARIDATE of POTASSIUM** (Balluff, Eberle, Ebert, Maisch, Squibb). xx, 61.
- **home-made CHEMICALS** (Kennedy, Luhn, Maisch, Menninger, Scheffer). xxvi, 902.
- **CHLORAL** (Ebert, Maisch, Markoe, Remington, Squibb). xviii, 117—(Brady, Diehl, Ebert, Maisch, Markoe, Procter). xix, 89.
- **separation of CINCHONA ALKALOIDS** (Maisch, Menninger). xxvi, 920.
- **CINNAMON WATER** (Hancock, Maisch, Markoe, Saunders). xxiv, 685.
- **CITRINE OINTMENT** (Baker, Bedford, Ebert, Lloyd, Markoe, Remington, Sloan, Thompson, Vogeler). xxix, 507.
- **CITRATE of MAGNESIA** (Diehl, Ebert, Maisch, Markoe, Parrish, Sander, Sargent). xix, 103, 4.
- **COCA** (Kennedy, Maisch, Rose, Saunders). xxvi, 880.
- **COLOGNE** (Creuse, Garrison, Hancock, Leis, Maisch, Markoe, Vogelbach). xxiv, 687—(Ebert, Gregory, Markoe, Menninger, Saunders, Squibb). xxv, 546.
- **alterations of the CONSTITUTION** (Bullock, Squibb). xxi, 37, 8.
- **COSMOLINE** (Bedford, Lemberger, Maisch, Miller, Moore, Remington, Sargent) xxii, 507.
- **COUNCIL** (Ebert, Parrish, Sargent). xix, 113—(Moore, Procter, Shinn, Squibb, Wright). xx, 51—(Ebert, Markoe, Remington) xxvii, 792—(Baker, Becker, Earekson, Ebert, Maisch, Menninger, Remington, Shinn, Squibb). xxviii, 530.
- **CREASOTE** (Maisch, Remington, Sander). xx, 66—(Bedford, Maisch, Remington). xxx, 647.
- **committee on CREDENTIALS** (Bedford, Maisch). xxv, 481.
- **CURTMAN's pharm. still** (Curtman, Ebert, Parrish, Sander). xix, 117.
- **DAMIANA** (Maisch, Mohr, Pfeiffer, Wellcome). xxiv, 679—(Menninger, Murray). xxvi, 881.
- **DELEGATES**, entitled (or not) to admission (Judge, Moore, Squibb). xx, 71.
- **MAXIMUM DOSES** (Maisch, Pile), xxiii, 806.
- **remittance of DUES** (Maisch, Procter, Sargent). xix, 97.
- **ELIXIRS** (Balluff, Bedford, Ebert, Gardner, Hancock, Moore, Procter, Scheffer, Shinn, Squibb). xx, 80—(Hancock, Maisch, Markoe). xxi, 91—(Balluff, Colcord, Ebert, Hancock, Moore, Peixotto, Roberts, Thompson). xxii, 559—(Becker, Bedford, Bidwell, Creuse, Eberle, Gardner, Kennedy, McIntyre, Maisch, Mattison, Mercein, Saunders, Wells). xxiii, 784.
- **EMULSION of almonds** (Ebert, Gregory, Shinn, Wellcome). xxv, 557.
- **ENTERTAINMENTS** (Garrigue, Jamieson, Squibb). xx, 78—(Gardner, Maisch, Seabury, Shinn). xxx, 643, 4.
- **EXHIBITIONS** (Maisch, Remington, Saunders, Sheppard, Wellcome). xxv, 570.
- **EXTRACT OF BEEF** (Brady, Ebert, Maisch, Procter). xix, 79.
- **EXTR. MALT** (Cowdrey, Maisch, Menninger, Prescott). xxx, 637, 640.
- **annual FEES** fr. \$3 to \$5 (Coddington, Colcord, Maisch, Procter, Sargent, Squibb, Stabler, Taylor, Tufts). xviii, 44.
- **JULIUS FEHR** (Bedford, Bullock, Eberle, Fehr, Hancock, Neergaard, Sheppard, Squibb). xxiv, 619.
- **FILTERING PAPER** (Brown, Folger, Pile). xxiv, 683.
- **FLUID EXTRACTS** (Diehl, Maisch, Markoe, Shinn, Squibb). xviii, 102—(Lloyd, Markoe, Remington). xxx, 657.
- **FLUID EXTRACT GOSSYPIMUM** (Judge, McIntyre, Maisch, Rice, Wellcome). xxiv, 666.
- **FLUID EXTR. LACTUCARIUM** (Lemberger, Maisch, Saunders, Shinn). xxvi, 897.
- **FLUID EXTR. SENECA** (Diehl, Maisch, Parrish, Procter). xix, 115.
- **FLUID EXTR. WILD CHERRY** (Kennedy, Lloyd, Luhn, Maisch, Menninger, Shinn). xxvi, 883.
- **FLUID VOLUME** (Candidus, Menninger, Squibb). xxviii, 553.

- Discussions: UNOFFICIAL FORMULÆ** (Ebert, Markoe, Procter, Squibb, Taylor). xviii, 63—(Gardner, Maisch, Mattison). xxiii, 775.
- **INCREASING FUNDS** (Kuhn, Land, Maisch, Menninger, Rose, Saunders, Shinn, Sloan, Tufts, Wood). xxvi, 910.
- **CENTENNIAL FUND** (Maisch, Menninger, Nichols, Remington, Shinn). xxv, 528.
- **SINKING FUND** (Bullock, Squibb, Tufts). xxi, 32—(Maisch, Nichols, Squibb). xxi, 84.
- **TANNIN IN GENTIAN** (Kennedy, Lloyd, Maisch). xxix, 504.
- **GEORGETOWN school of pharmacy** (Brown, Judge, Menninger, Moore, Squibb). xx, 69.
- **GERMINATION of seeds** (Gregory, Kline, Lloyd, Maisch, Menninger, Remington, Saunders, Shinn). xxx, 647.
- **GLUCOSE** (Bedford, Ebert, Remington). xxix, 519.
- **GLYCERIN** (Maisch, Remington, Squibb). xviii, 70.
- **GLYCYRRHIZIN** (Kennedy, Lloyd, Maisch, Menninger). xxvi, 891.
- **GRADUATES** (Pile, Sharples, Wharton). xxiv, 681.
- **GRANULAR EFFERVESCENT salts** (Ebert, Lemberger, Maisch, Mattison, Moore, Remington). xxii, 523.
- **GRASSLY'S letter**. (Balluff, Bullock, Ebert, Maisch, Menninger, Squibb, Stabler). xxi, 67.
- **GUARANA** (Kennedy, Mohr, Rose). xxvi, 900.
- **HERBS, preserved** (Diehl, Ebert, Harrop, Judge, Maisch, Markoe, Procter, Sargent, Saunders, Sander). xix, 121.
- **Mexican HONEY ANT** (Bullock, Saunders, Squibb). xxi, 89.
- **GENERAL INDEX** (Maisch, Sargent, Shinn, Squibb). xxi, 89.
- **invitation to INTERNATIONAL CONGRESS** (Brady, Ebert, Gallagher, Maisch, Parrish, Procter). xix, 71.
- **INVITATIONS to excursions, etc.** (Ebert, Squibb, Stabler). xxi, 75—(Maisch, Markoe, Pile, Procter, Squibb). xxi, 84.
- **IRON, DIALYZED** (Diehl, Maisch, Remington, Pile, Squibb). xxv, 559.
- **IRON, PHOSPHATE, soluble** (Dohme, Maisch, Remington). xxix, 515.
- **IRON, TASTELESS, Rutter's** (Creuse, Maisch). xxiii, 816.
- **LACTOPEPTIN** (Colcord, Creuse, Diehl, Scheffer). xxiv, 671.
- **American EXTR. LICORICE** (Ebert, Miller, Pile). xxii, 498.
- **LIFE-MEMBERSHIP** (Bullock, Calder, Ebert, Maisch, Menninger, Shinn, Sheppard, Squibb). xxv, 527, 529, 541; xxvi, 911, 2, 3.
- **LIEBIG MEMORIAL** (Balluff, Ebert, Hancock, Pixotto, Ramsperger, Smith). xxii, 529.
- **LIQUOR DEALERS' LICENSE** (Dalrymple, Ebert, Maisch, Parrish, Procter, Sargent). xix, 65—(Maisch, Moore, Parrish, Procter). xix, 86—(Moore, Sander). xx, 29—(Ebert, Maisch). xxii, 497—(Bedford, Ebert, Maisch, Moore, Schaefer). xxii, 545—(Ebert, Llewellyn, Maisch, Markoe). xxix, 517.
- **best month for MEETING** (Baker, Bedford, Bullock, Diehl, Good, Ingalls, Markoe, Menninger, Remington, Saunders, Sheppard). xxx, 664.
- **early MEETING** (Land, Maisch, Menninger, Scheffer, Shinn, Sloan). xxvi, 895.
- **prolongation of MEETING** (Balluff, Colcord, Ebert, Remington, Wright). xxii, 541.
- **RECONSIDERATION of a selected place of MEETING** (Bedford, Maisch, Parrish, Procter, Rogers, Sargent). xix, 125.
- **MEETINGS in SOUTHERN STATES** (Dalrymple, Diehl, Ebert, Gordon, Maisch, Procter, Sargent). xix, 107—(Diehl, Eberle, Gordon, Menninger, Osborne, Procter, Sander, Wright). xx, 98—(Ingalls, Land, Maisch, Menninger, Murray, Saunders, Tarrant). xxvi, 908.
- **committee on MEMBERSHIP** (Bedford, Kennedy, Maisch, Remington, Shinn, Sloan). xxviii, 572.
- **ELIGIBILITY to MEMBERSHIP** (Dill, Eberle,

Discussions. (Continued.)

- Gardner, Judge, Jarrett, Kennedy, Luhn, Maisch, Menninger, Sloan). xxvii, 757—(Baker, Kennedy, Land, McKelway, Maisch, Markoe, Menninger, Remington, Shinn, Sloan, Squibb). xxviii, 535.
- **INCREASE OF MEMBERSHIP** (Ebert, Moore). xxii, 521.
- **PROFESSORS at colleges of pharmacy, MEMBERS** (Bedford, Markoe, Shinn, Tufts). xxiii, 795.
- **EXPULSION OF MEMBERS** (Bullock, Eberle, Squibb, Wellcome). xxv, 513.
- **MERCER'S letter about his report** (Diehl, Maisch, Procter, Squibb) xxi, 44.
- **MERCURIAL OINTMENT** (Bedford, Cowdrey, Heinisch, Kennedy, Kline, Lloyd, Menninger, Remington, Roberts, Rosenwasser, Saunders, Shinn). xxx, 623, 5.
- **METRIC weights and measures** (Maisch, Sharples, Squibb) xxiv, 636—(Kennedy, Maisch, Menninger, Murray). xxvi, 887.
- **MICHIGAN school of pharm.** (Brown, Dalrymple, Ebert, Gallagher, Maisch, Markoe, Parrish, Procter, Sargent). xix, 28, 30.
- **MICROSCOPE** (Bullock, Hoffman, Maisch, Saunders, Sharples). xxiv, 679—(Bedford, Maisch, Markoe, Menninger). xxv, 565.
- **MILK-SUGAR** (Ebert, Hallberg, Lemberger, Remington, Vogeler). xxix, 509.
- **NEWSPAPER reports** (Maisch, Procter). xix, 126.
- **NOMENCLATURE, CHEMICAL** (Maisch, Murray). xxvi, 903.
- **NOMENCLATURE, PHARMACOPŒIAL** (Maisch, Oldberg, Remington, Squibb). xxviii, 545.
- **NOMINATING committee** (Bedford, Ebert, Kennedy, Maisch, Markoe, Menninger, Remington, Roberts). xxviii, 509—(Becker, DeForrest, Eberle, Ebert, Main, Markoe, Moore, Nicot, Remington, Roberts). xxviii, 554.
- **NETGALLS, AMERICAN** (Garrigues, Procter, Saunders, Squibb). xxi, 88.
- **OINTMENT BOXES** (Diehl, Ebert, Markoe, Menninger, Remington). xxi, 78.
- **OLEATES** (Gardner, Kennedy, Maisch, Markoe, Remington, Squibb). xxv, 521.
- **OPIUM, ASSAY** (Colcord, Ebert, Squibb). xviii, 79.
- **OPIUM, AMERICAN** (Ebert, Hancock, Mattison, Remington, Saunders). xxii, 554.
- **PARAFFIN PAPER** (Gregory, Maisch, Shinn, Wellcome). xxv, 563.
- **PARTS BY WEIGHT** (Judge, Maisch, Pile, Royce, Wharton). xxiv, 677—(Gregory, Maisch, Markoe, Squibb). xxv, 519.
- **mentioning of PATENTED ARTICLES** (Ebert, Fehr, Hancock, Maisch, Remington, Thompson). xxii, 565—(Ebert, Hancock, Maisch, Remington). xxii, 572.
- **PEPSIN** (Ebert, Hoffmann, McCollins, Meyers, Procter, Squibb). xviii, 73.
- **PERCOLATION** (Campbell, Eberle, Lloyd, Maisch, Markoe, Remington). xxvii, 787.
- **PETROLEUM OINTMENT** (Menninger, Remington, Thompson). xxix, 506.
- **PHARMACOPŒIA, PERMANENT COMMITTEE** (Diehl, Ebert, Markoe). xxi, 92—(Ebert, Maisch, Markoe). xxi, 76.
- **PHARMACOPŒIA, REVISION** (Bedford, Colcord, Dohme, Eberle, Hancock, Judge, Kennedy, Markoe, Moore, Rice, Sargent, Squibb, Wharton). xxiv, 630—(Bedford, Bullock, Calder, Ebert, Hoffmann, Menninger, Remington, Sheppard, Shinn, Squibb). xxv, 531, 2, 5—(Ebert, Kennedy, Maisch, Menninger, Remington, Rice, Saunders, Sheppard). xxv, 554.
- **PHARMACOPŒIA REVISION, PUBL. OF REPORT** (Diehl, Ebert, Gardner, Good, Maisch, Markoe, Menninger, Robert, Ross, Vogeler). xxvii, 795.
- **PROGRESS OF PHARMACY, committee** (Procter, Shinn, Stabler, Taylor). xviii, 58—(Gordon, Maisch, Squibb). xx, 68—(Balluff, Diehl, Ebert, Maisch, Procter, Saunders, Squibb). xx, 74.
- **PHONOGRAPHIC REPORT, to be printed in FULL, or not** (Maisch, Parrish, Sander, Sargent). xix, 119—Brown, Judge, Menninger, Moore, Squibb. xx, 69.

- Discussions: DILUTED PHOSPHORIC ACID** (Dohme, Ebert, Maisch, Mattison, Remington). xxii, 511—(Bullock, Dohme, Markoe, Pile). xxiii, 810—(Bullock, Dohme, Eberle). xxiii, 813—(Diehl, Kennedy, Markoe, Menninger, Rice, Sharp, Sharples, Squibb, Wharton). xxiv, 623—(Lloyd, Maisch, Markoe). xxx, 652.
- **PHOSPHORETTED RESIN** (Hancock, Maisch, Pile, Remington, Saunders). xxii, 553—(Close, McIntyre, Maisch, Mattison, Pile, Saunders, Wellcome). xxiii, 827.
- **PILLS, solubility** (Eberle, Kennedy, Maisch). xxiii, 726.
- **PODOPHYLLIN** (Kennedy, Maisch, Shinn, Wellcome). xxv, 560—(Lloyd, Maisch, Shinn). xxvi, 896.
- **POWDERED DRUGS** (Lloyd, Maisch, Richardson). xxx, 654.
- **PORTRAITS** (Ebert, Maisch, Moore). xxii, 520.
- **PRIZE ESSAYS** (Bedford, Bullock, Lincoln, Maisch, Markoe, Moore, Remington, Sargent, Saunders, Shinn, Sheppard, Vogelbach, Wellcome). xxiv, 656.
- **EARLIER PUBLICATION of papers** (Diehl, Ebert, Maisch, Nichols, Procter, Squibb). xxi, 82—(Maisch, Moore) xxii, 521—(Bidwell, Bullock, Creuse, Eberle, Maisch, Mattison, Rice, Shinn). xxiii, 792.
- **REVISION OF PROCEEDINGS, and expunging irrelevant words** (Colcord, Hancock, Judge, Maisch, Menninger, Peixotto, Saunders, Scofield, Sheppard, Wellcome) xxiv, 667.
- **INDISCRIMINATE PUBLISHING of papers** (Eberle, Ebert, Maisch, Markoe, Menninger, Remington, Scofield, Wellcome, Whitfield). xxvii, 789.
- **NEGLECT TO REPLY to queries** (Balluff, Brown, Ebert, Gordon, Procter, Remington, Squibb). xx, 54—(Ebert, Procter, Rittenhouse, Squibb). xviii, 67.
- **REPORTER progress of pharmacy** (Bullock, Maisch, Procter, Squibb). xxi, 36—(Bullock, Maisch, Peixotto, Squibb, Stabler, Thompson). xxi, 61, 73.
- **RHUBARB** (Maisch, Robbins, Squibb, Thomsen). xxv, 549.
- **SALICYLIC ACID** (Diehl, Kennedy, Mattison, Squibb, Wellcome). xxv, 549.
- **SANTONIN** (Diehl, Maisch, Remington). xxii, 517—(Eberbach, Maisch, Pfeiffer, Wharton). xxiv, 683.
- **SARSAPARILLA**, (Balluff, Maisch, Squibb). xxi, 95.
- **SAUNDERS, as chairman of committee on drug-market** (Colcord, Remington, Saunders, Squibb). xxiv, 595.
- **SUSPENSION OF RULES during discussion of scientific subjects** (Brown, Ebert, Markoe, Parrish, Procter, Sander). xix, 61, 91, 92.
- **SEIDLITZ POWDER** (Diehl, Ebert, Pile, Procter, Rice, Squibb). xx, 89.
- **SENEGAL** (Bedford, Maisch, Saunders, Sharp, Sharples). xxiv, 661—(Crawford, Lloyd, Maisch, Saunders). xxix, 521.
- **SHARPLES as a member** (Babcock, Bedford, Bullock, Diehl, Kennedy, Maisch, Wiegand). xxiii, 753, 6.
- **SIGNAL SERVICE weather reports** (Menninger, Squibb). xx, 57.
- **SODA BICARBONATE** (Bedford, Bullock, Maisch, Miller). xxiii, 822.
- **READY SOLUTIONS for prescription counter** (Bullock, Ebert, Kennedy, Menninger, Stuart). xxix, 520.
- **SOLUBILITY OF CHEMICALS in alcohol** (Candidus, Diehl, Lloyd, Parsons, Rosenwasser). xxx, 621.
- **committee on SPECIMENS (exhibition)**, Baxley, Maisch, Squibb). xviii, 65.
- **insufficient STAMPING** (Buck, Ellis, Sander, Sargent). xix, 100.
- **repeal of STAMP TAX** (Baker, Ebert, Gordon, Maisch, Moore, Schafer). xxviii, 562.
- **ARMY AND NAVY STEWARDS** (Kennedy, Maisch, Markoe, Menninger). xxx, 659.
- **SUBSTITUTION for specified maker prescribed** (Balluff, Ebert, Hancock, Moore, Procter, Shinn, Squibb). xx, 82.
- Discussions: SULPHUR, PRECIPITATED** (Brady, Procter, Remington). xix, 65.
- **SUPPOSITORIES** (Eberle, Ebert, Maisch, Procter, Squibb). xviii, 83—(Bailey, Colcord, Ebert, Hancock, Judge, Kennedy, Maisch, Mattison, Peixotto, Pile, Ramsperger, Remington, Saunders, Thompson, Wells). xxii, 500.
- **SYRUP IODIDE IRON** (Brown, Eberle, Hancock, Kennedy, Maisch, Markoe, Painter, Pile, Remington, Rice, Sargent, Sharp, Shinn, Wharton). xxiv, 664.
- **SYRUP PYROPHOSPH. IRON.** (Kuhn, Lloyd, Maisch, Menninger, Rose, Sloan, Wood). xxvi, 898.
- **TENNESSEE COLLEGE of pharmacy** (Babcock, Bedford, Bidwell, Bullock, Calder, Diehl, Eberle, Fehr, Kennedy, Lillard, Maisch, Robert, Saunders, Sheppard, Shinn, Tufts). xxiii, 830—(Babcock, Bullock, Hancock, Lillard, Luhn, Menninger, Saunders, Squibb, Wharton). xxiv, 611.
- **THYMOL** (Bedford, Gregory, Heinitsh, Lemberger, Lloyd, Maisch, Prescott, Remington, Rosenwasser, Sheppard, Shinn, Thompson). xxx, 616.
- **TIME AND PLACE** (Bedford, Dalrymple, Diehl, Ebert, Gordon, Maisch, Parrish, Procter, Sargent, Tufts). xix, 107—(Diehl, Eberle, Gordon, Maisch, Menninger, Osborne, Procter, Sander, Wright). xx, 98, 102—(Becker, Ebert, Gordon, Maisch, Menninger, Remington, Saunders, Shinn, Whitfield) xxviii, 564.
- **TINCTURES FR. FRESH and DRIED PLANTS** (Lloyd, Maisch, Rose). xxvi, 899.
- **alcohol in TINCT. FERRI CHLORIDI** (Benjamin, Judge, Kennedy, Maisch, Pfeiffer, Pile, Rice, Saunders, Wharton). xxiv, 675.
- **TRADEMARKS** (Cowdrey, Maisch, Menninger). xxx, 641.
- **TREASURER'S SALARY** (Eberle, Squibb). xxv, 539.
- **TREASURER'S ANNUAL REPORT** (Eberle, Menninger, Remington). xxvii, 781.
- **VERATRUM VIRIDE** (Bullock, Robbins, Squibb). xxv, 523.
- **WESTERN WHOLESALE DRUGGISTS** (Bedford, Menninger, Remington, Roberts, Rosenwasser). xxx, 596—(Good, Gordon, Menninger, Murray, Shinn, Wells). xxx, 633.
- **WHITE WAX** (Bedford, Ebert, Markoe, Remington, Shinn, Squibb). xxv, 543.
- Disinfectants**. xix, 165, 166—analyzed, Coughlin. xxiv, 420—hyponitrous acid, best. xxi, 149—odorous plants and flowers which develop ozone, Mantegazza. xix, 176.
- Dispensatory**, Wood and Bache, Squibb. xxiv, 631.
- Dispensing COUNTER, arrangement**, Hancock. xx, 192—xxiv, 456—ready kept SOLUTIONS, Sloan. xxix, 404.
- Displacement, CONTINUOUS**, Weigelt. xxix, 37.
- See PERCOLATION.
- Displacer**, Zulkewski. xxii, 44.
- See PERCOLATOR.
- Diosotis PLUMOSA**, Liberia, descript., Holmes. xxvii, 237.
- Distillation, removal of saline residue (circulatory solut.)**, Lehmann. xix, 137—apparatus, Behrend. xxviii, 32—large quantities fr. small retort, Squibb. xxi, 535.
- **FRACTIONAL**, Bevan. xxvi, 75—(cylinder filled with glass pearls), Hempel. xxx, 46.
- **VACUUM**, Procter. xxv, 45.
- See also STILL.
- District Columbia, pharmacy law**. xxvi, 662, 4.
- Dita bark** = *Alstonia scholaris*. xxii, 111—analysis, Jobst and Hesse. xxiv, 136.
- Ditain, history** (discovered by Scharlée), Husemann. xxvi, 605—prop., Gruppe. xxii, 111; xxv, 370; not pure, Hildwein. xxii, 273; existence doubted, Jobst and Hesse. xxiv, 366—administration, Gruppe. xxv, 368—febrifuge, Pina. xxii, 111.
- Ditamina, history**, Husemann. xxvi, 605—prep. and prop., Gruppe. xxv, 371—Jobst and Hesse. xxiv, 137, 366—MURIATE, reactions, Jobst and Hesse. xxiv, 367.

- Dividivi** fr. *Cæsalpinia coriaria*. xxiv, 191—estimat. of tannin, Simpkin. xxiv, 341—India. xxiv, 718—Jamaica. xxiv, 736.
- Djave**=*Bassia oleifera*, Africa. xxix, 115.
- Djia-no-shige**=*Ophiopogon japonicus*, Japan. xxviii, 204.
- Djumtaa**=*Rheum palmatum* var. *tanguticum*, Central Asia. xxvi, 197.
- Dock, WATER**=*Rumex lapathicus*; *R. verticillatus*, Kansas. xxix, 449.
- Dockmackie**=*Viburnum acerifolium*. xxvi, 243.
- Dodecatheon** MEADIA, Kansas. xxix, 449.
- Dogwood, JAMAICA**=*Piscidia erythrina*. xxiv, 735—chem. and physiol., Nagle. xxix, 221—hypnotic value. xxx, 245; xxviii, 186.
- **WHITE CORNELL**=*Cornus paniculata*, Kansas. xxix, 443.
- Dohme, Louis**. Acid phosphor. dilut. and tinct. ferri chlorid. xxii, 431, 511, 512; xxiii, 662—arsenic in phosphorus. xxiv, 541—soluble ferric phosphate. xxix, 434, 515—iron preparations, xxviii, 452.
- discussions. xxi, 100; xxii, 511, 512, 513, 514; xxiii, 812, 813, 814; xxvi, 629, 645; xxix, 515, 516, 524.
- Do-ku-quats**=*Aralia edulis*, Japan. xxviii, 161.
- Doliber, Thomas**. Acid. sulph. arom. xix, 444.
- discussions. xix, 31, 61, 98.
- Dolichos** TRILOBUS, China. xxiv, 743, 758.
- **TUBEROSA**, Mexico. xxiv, 776.
- Dolique** SEED, Turkey. xxiv, 779.
- Dolomite**, California. xxvii, 593.
- Domata**=Tomato pulp, Orient. xxiv, 132.
- Domdom**=*Phytolacca australis*, Chili. xxiv, 765.
- Donation**, "Ebert's prize." (which see). xxi, 58.
- Donatus, Joseph**. xxvi, 845.
- Dookoo**=a spec. of *Ferula*, India, descript., Dymock. xxv, 170; xxvii, 194.
- Doorn tea**, So. Africa = *Cliffortia ilicifolia*. xxii, 148.
- Doradilla**, Arg. Republ. xxiv, 763—=*Lycopodium nidiformis*, Mexico. xxiv, 769—=*Polypodium* spec., Chili. xxiv, 765.
- Dorema** AMMONIACUM, root, India, descript., Dymock. xxiv, 154.
- Doronicum** SCORPIOIDES, India, descript., Dymock. xxviii, 149.
- Doryphora** DECEMLINEATA cont. no cantharidin, Dembinski. xxvi, 331.
- Dosing** in dispensing simplified, Fuller. xxvi, 89.
- Dosjen**=*Aralia edulis*, Japan. xxviii, 161.
- Do-tooki**=*Aralia edulis*, Japan. xxviii, 161.
- Dowra**=*Conocarpus latifolia*, India. xxiv, 718.
- Dracæna** SCHIZANTHA, Socotra. xxviii, 108.
- Draciana** FERREA, Mauritius. xxiv, 741.
- Dracontium**, adult. of powd. xxx, 577.
- Dragon's blood**, adult. (oxide iron, resin), Bretet. xxiv, 405—behavior to reagents, Hirschsohn. xxvi, 453—soluble in eucalyptus oil, Osborne. xxvii, 234.
- **SOCOTRA**, fr. *Dracæna schizantha*, descript. and collection, Hildebrandt. xxviii, 108.
- Dragon, GREEN**=*Arisæma dracontium*, Kansas. xxix, 440.
- Dressing, ANTISEPTIC**, Eilau. xxvii, 121.
- Drimys** GRANATENSIS, Brazil. xxiii, 120.
- Drop MACHINE** (fr. graduate and fr. definite quantity), Wilder. xix, 156.
- Dropper**, attachable to bottle (rubber bulb), Bravais. xxix, 53.
- , a bent glass rod. xxx, 55.
- Drop, size** (depends on chemical comp.), Quincke. xix, 140—equivalent, Talbot. xxix, 33.
- Drosera** INTERMEDIA, cont. free citric acid, Stein. xxviii, 173.
- **LONGIFOLIA**, history and uses, Vigier. xxvii, 225.
- **ROTUNDIFOLIA**, analysis, Lugan. xxvii, 227—history and uses, Vigier. xxvii, 225.
- Droseraceæ**. xxvii, 225; xxviii, 173.
- Drub-el-ma**, (Arabic)—refined olive oil. xxii, 108.
- Drugs, drying**. xxiii, 596—loss in drying. xxi, 202—air-dry, moisture, Kennedy. xxi, 138—how to gather. xviii, 139—preserve dry, Melsens. xviii, 206.
- **INDIGENOUS**, source of supply and statistics, Diehl. xviii, 137—xxii, 617.
- Drugs, ARGENTINE REPUBLIC**, Cent. exhibit. xxiv, 761.
- **AUSTRIA**, Schroff. xxii, 166—Cent. exhibit. xxiv, 743.
- **BRAZIL**, Holmes. xxiii, 120.
- **CANADA**, quality. xxv, 341.
- **CAPR OF GOOD HOPE**, Cent. exhib. xxiv, 738.
- **CENTENNIAL** exhibition. xxiv, 712.
- **CHILI**, Cent. exhib. xxiv, 764.
- **CHINA**, Cent. exhib. xxiv, 743.
- **EGYPT**, Cent. exhib. xxiv, 743.
- fr. the 15TH CENTURY, Nördlingen, Flückiger. xxvi, 170.
- **GERMANY**, Cent. exhib. xxiv, 742.
- **Brit. GUIANA**, Cent. exhib. xxiv, 738.
- **EAST INDIA**, Evers. xxiii, 119—Dymock. xxv, and subsequent volumes—Cent. exhib. xxiv, 714, 724—India museum at Kensington. xxiv, 115.
- **ITALY**, Cent. exhib. xxiv, 743.
- **JAMAICA**, Cent. exhib. xxiv, 731.
- **JAPAN**, Holmes. xxviii, 99—Schaer. xxiii, 120—Cent. exhib. xxiv, 761.
- **LIBERIA**, Holmes. xxvi, 168.
- **MALTA**, Watson. xxvi, 167.
- **MEXICO**, Cent. exhib. xxiv, 767.
- **MOROCCO**, Learned; Holmes. xxiii, 121; xxiv, 114.
- **NETHERLANDS**, Cent. exhib. xxiv, 742.
- **PHILIPPINE ISLANDS**, Cent. exhib. xxiv, 767.
- **QUEENSLAND**, Cent. exhib. xxiv, 740.
- **RUSSIA**, Cent. exhib. xxiv, 780.
- **SPAIN**, Cent. exhib. xxiv, 766.
- **TURKESTAN**, Dragendorff. xxi, 201.
- **TURKEY**, Cent. exhib. xxiv, 778.
- medicinal, standardized, Ford. xxvii, 734.
- rejected at custom-house, New York. xxi, 441; xxii, 642.
- **POWDERED**, adult. xxi, 486; xxiv, 393—Allaire. xxx, 574—test for mineral adulterant, (chlorof.) Siebold. xxviii, 278—importation to be prohibited, Squibb. xix, 499—purity, xxx, 574, 654—attack zinc vessels, Nessler. xxx, 56.
- list of prices for 1870-71. xix, 405—by original package xx, 128.
- **BROKERS**, demoralizing effect. xxi, 422.
- business in relation to med. and pharm., Robbins. xix, 409.
- Drug market: BALTIMORE**. xxi, 449; xxii, 642.
- CANADA**. xxv, 335. **CINCINNATI**. xxi, 447.
- NEW ORLEANS**. xxi, 448. **NEW YORK**. xxv, 344. **PHILADELPHIA**. xx, 142. **PITTSBURG**. xxi, 443. **RICHMOND, (Va.)** xxvi, 646. **St. LOUIS** xxv, 343. **SAN FRANCISCO**. xxiv, 401; xxvii, 562.
- See also **COMMITTEE** on drugmarket and **REPORT** of same; and also the **RESPECTIVE DRUGS**.
- **MILLS**, Blair. xxiii, 575; xxiv, 61—Enterprise. xxiii, 582—Hance. xx, 180; xxiii, 579—Schroeder & Co. xxvii, 41—Eberle. xx, 64; xxiii, 804—Swift. xxiii, 576, 584, 5, 6, 804—Thomas. xxiii, 577—Træmner. xxiii, 581.
- **MILLER**, conscientious, Maisch. xxx, 654.
- **PRESS**, Enterprise. xxviii, 29, 78—George. xxvii, 42—Schlag and Behrend. xxviii, 29.
- **TARIFF**. xx, 132—annoying ambiguity. xix, 391—Canada, curiosities. xxv, 336.
- **TRADE**, speculation, Lehn xxx, 462.
- Druggist**, definition of term, Robbins. xix, 412—statistics, Stacey. xxii, 516—wholesale and retail, Bedford. xxx, 627; Menninger. xxx, 633, 5.
- Drunkenness** cured by fluoride potassium, Da Costa. xxx, 278.
- Drying CLOSETS**, (sheet-iron) Cowan. xxix, 49—(recess in wall) Greenish. xxvii, 53—(quicklime in bottom) Kirsten. xxix, 59; xxx, 53—(contin. draft of warm air) Muencke. xxix, 50; Rohrbeck. xxviii, 36—(automat. gas-cut-off) Suess. xxix, 51—(skeleton wire shelving over stove) Wilder. xxvii, 55.
- **OVEN** (baking attachment to coal oil stove) Vogeler. xxx, 52—(constant temperature) Kirchner. xxx, 51—Kirchmann. xxx, 50—(portable) Roeder. xxviii, 37—see also **DESI-CATOR**.
- Daojo**=*Discorea japonica*, Japan. xxviii, 111.

- Dualin, Dittmar. xix, 169.
 Duboisia HOPWOODII, Australia, account. xxv, 138; xxvii, 162, note—constituents, Müller and Rummel. xxviii, 122.
 — MYOPOROIDES, descript., Holmes. xxvi, 206—Lanessan. xxvii, 159—analysis, Gerrard. xxvi, 207—alkaloid, Pettit. xxvi, 208.
 Duboisin. xxvii, 32—is accumulative, Dujardin-Beaumetz. xxix, 338—duration of act. on eye. xxviii, 335—ident. with atropidin, Regnault; Valmont. xxx, 422; with hyoscyamin, Ladenburg. xxviii, 335; xxx, 422; with piturin, Müller; Rummel. xxvii, 519—in crystals, Duquesnel. xxix, 339.
 — SULPHATE. xxviii, 371; xxix, 372; xxx, 472—ophthalmic value, Risley. xxviii, 335.
 Duck meat—Lemna minor, Kansas. xxix, 447.
 Duffield, J. P. Aconite poisoning. xviii, 189—poison cabinet. xviii, 194.
 Duhn-ul-fagiya (Arabia), oil of Lawsonia alba. xxvii, 239.
 Duinen tea, So. Africa—Helichrysum imbricatum. xxii, 119.
 Dulcamara, loss in drying. xxi, 203—germinat. of seed, Saunders. xxx, 567.
 Dulcamarin is a glucoside, Geisler. xxiv, 375.
 Dulcamaretin, Geisler. xxiv, 376.
 Dulcin yields iodoform, Hager. xxx, 346.
 Dulcite and oxalic ac. yield formic ac., Lorin. xxii, 250.
 Dulcitamina, Bouchardat. xxi, 385.
 Dumaso—Tagonia mysorensis, India. xxv, 174.
 Duplo-SULPHACETON. Wislicenus. xxii, 230.
 Durango PLANT—Triceras glomerata, California. xxvii, 68.
 Duraznillo (del agua), Arg. Republ. xxiv, 761, 2—Cestrum pseudoguina, Arg. Republ. xxx, 138.
 Durham mustard, origin of name. xxii, 133.
 Dutchman's BREECHEs—Dicentra cucullaria, Kansas, xxix, 445.
 — PIPE—Aristolochia siphon, Kansas. xxix, 440.
 Dyamettin in pareira, Flückiger. xviii, 288.
 Dyes, by act. of sulphides upon diff. substances, Croissant and Bretonnière. xxiii, 463.
 — India, Cent. exhib. xxiv, 714, 6—Jamaica. xxiv, 736.
 Dynamite explodes in ozone, Jouglot. xix, 176.
 Dysentery plant, Liberia—Oldenlandia globosa. xxvii, 182.
 Dziwô—Rchmannia lutea, Japan. xxviii, 295.

E.

- Earthenware, glaze free fr. lead, Constantin. xxiv, 63.
 Ear wax, solvent, Petriquin. xix, 167.
 Earekson, Edwin, discussion. xxviii, 532, 533, 534, 540.
 Eastman, Chas. S. xxvi, 894.
 Ebenaceae. xxiv, 139; of Kansas. xxix, 444.
 Eberbach, Ottmar, colchicin. xxii, 453—elixirs. xx, 264, 271—report on adulterations. xxiv, 403—santonine. xxiv, 544—Walker's vinegar bitters. xxiii, 732.
 — discussion. xxiv, 650, 683.
 Eberle, Chas. L., cantharidate of potassium. xx, 62—drug mill. xx, 64—percolation. xxvii, 788—revision of pharmacopœia. xxiv, 640—poisons. xxi, 575—medicinal effects of succus conii and belladonna. xxiv, 673—suppositories. xviii, 83, 150—tinct. colombo. xxi, 594.
 — discussions. xviii, 83, 84, 85; xx, 62, 64, 83, 90, 100; xxiii, 753, 754, 785, 792, 793, 794, 796, 804, 814, 834, 838; xxiv, 574, 613, 617, 619, 620, 621, 640, 648, 649, 660, 664, 665, 673; xxv, 513, 516, 519, 540; xxvii, 757, 758, 781, 788, 790; xxviii, 532, 560, 570.
 Ebert, A. E. Acid. phosphor. dilut. xxii, 511, 514—annual address. xxi, 46; inaugural address. xx, 48—on opening 21st meeting. xxi, 25—powd. blue mass. xxii, 526—chloralhydrate. xix, 90—cinchoquinine. xxii, 448—citrate magnesia. xix, 105—letter of donation. xxi, 58—elixirs. xx, 81; xxii, 559—emulsion of almonds. xxv, 557—extract of meat. xix, 512—glucose. xxix, 519—homœopathic remedies. xxi, 51—in-venting internat. pharm. congress. xix, 71, 73, 74—liquor dealers' license. xxii, 547; xxix, 517—
 milk sugar. xxix, 510—nomination of officers, not present. xxi, 49; xxviii, 555—ointment boxes. xxi, 78—opium and poppy culture in U. S. xix, 103—American opium swindle. xxii, 554—prizes. xxi, 48.
 — discussions. xviii, 48, 54, 63, 64, 66, 67, 68, 69, 76, 82, 84, 86, 107, 111, 114, 115, 123; xix, 30, 33, 61, 66, 71, 73, 74, 75, 76, 81, 82, 88, 90, 91, 92, 93, 95, 97, 103, 104, 105, 106, 108, 109, 110, 113, 114, 118, 121, 126; xx, 48, 55, 62, 68, 73, 77, 81, 82, 98; xxi, 25, 27, 29, 33, 66, 70, 74, 75, 76, 78, 83, 92, 93; xxii, 497, 498, 503, 507, 510, 511, 512, 513, 514, 520, 521, 522, 525, 526, 528, 531, 533, 534, 538, 539, 542, 544, 547, 554, 558, 559, 560, 561, 562, 563, 565, 572, 573; xxv, 508, 512, 534, 538, 542, 544, 548, 555, 556, 557, 567; xxvii, 789, 790, 793, 796, 802; xxviii, 509, 510, 511, 531, 544, 555, 556, 557, 558, 561, 564, 568; xxix, 508, 509, 510, 511, 519, 520, 521.
 Ebert fund and EBERT PRIZE. xxi, 53, 70.
 Ebert prize to C. L. Mitchell. xxiii, 784.
 Eburine (ivory dust and albumen). xxvi, 157.
 Ecballium ELATERIUM, India, descript., Dymock. xxvii, 229.
 Ecboine (Wenzell) identical with his own ergotin, Dragendorff and Podwissotzky. xxiv, 120.
 Ecgonia tr. coca, Lossen and Wöhler. xxvi, 765.
 Echicaoutchin fr. dita, Jobst and Hesse. xxiv, 137; xxv, 372.
 Echicerin fr. dita, Jobst and Hesse. xxiv, 137; xxv, 372.
 Echiina tr. Echium vulgare, has curare action, Buchheim. xix, 289.
 Echinacea HETEROPHYLLA, Mexico. xxiv, 775.
 Echinocystis (= Megarrhiza) OKEGANA, California. xix, 301.
 Echiretin fr. dita, Jobst and Hesse. xxiv, 137, 8—isomer with lactocerin and cubebs-camphor. Jobst and Hesse. xxv, 373.
 Echites SUBERECTA, alkaloid very poisonous, Bowrey. xxvi, 219.
 — SCHOLARIS. xxii, 111. See ALSTONIA SCHOLARIS and DITA BARK.
 Echitein fr. dita, Jobst and Hesse. xxiv, 137, 8; xxv, 372.
 Echitin fr. dita, Jobst and Hesse. xxiv, 137, 8; xxv, 372.
 Eclectic remedies, Parker. xxx, 127.
 Eclipta PROSTRATA, India, descript., Dymock. xxv, 157.
 Ecuador, cinchona forests, Wellcome. xxvii, 814.
 Edah = Dragon's blood, Socotra. xxviii, 108.
 Edera TERRESTRI = Glechoma hederacea, Malta. xxvi, 168.
 Education, PHARMACEUTICAL, Bedford. xxx, 590—Maisch. xix, 96—Prescott. xix, 96.
 Effervescent GRANULES, see GRANULES.
 — CITRATE MAGNESIA, analysis, Schrage. xxiii, 88.
 — CITRATES and TARTRATES, Schrage. xxiii, 88.
 Eggs contain zinc, Bellamy and Lechartier. xxvi, 400.
 — SAUCE, Cottrell. xxix, 83.
 Egusi = Bitter gourd, Gold Coast. xxiv, 741.
 Egypt, Centennial exhibit, drugs. xxiv, 743; pharm. prep. xxiv, 812.
 Eisenzucker, see IRON, SACCHARATED, SOLUBLE.
 Eka-boron (now "SCANDIUM"), predicted years ago by Mendelejeff. xxviii, 257.
 Eko = Coccus toxiferus, Brazil. xxvi, 216.
 Elæagnaceae. xxvii, 146.
 Elæagnus HORTENSIS, fruit for adulterating "chur-rus." xxi, 261.
 Elais GUINEENSIS, analysis of kernels, Nellino. xxi, 206—two kinds of oil, fr. kernel and fr. sarco-carp., Guyot. xix, 296—account. xxviii, 105.
 Elæocarpus DENTATUS, account, New Zealand. xxiv, 737; xxv, 366.
 — HOOKERIANA, New Zealand. xxiv, 737.
 Elæococca VERNICIA, China. xxiv, 173—oil of seeds, dries in a few hours. Cloëz. xxiv, 202.
 Elaphrium COPALLIFERUM, Mexico. xxiv, 767.
 — ELEMIFERUM, Mexico. xxiv, 195.
 — TOMENTOSUM, Mexico, yields tacamahac. xxiv, 195, 768.
 Elaterin reactions, Power. xxiii, 451—Lindo. xxvi, 617.

- Elaterium**, active principle is an anhydride of an acid, Buchheim. xxii, 34, 145—cultivat. at Hitchins, Holmes. xxvi, 278—in Lincolnshire, Holmes. xxx, 235—greatest yield early in the year, Köhler. xviii, 282.
- Elatine** substit. for tar water, Ciutlini. xxx, 57.
- Elayl chloride**. xxvi, 473.
- Elder LEAVES**, p. c. of ash. xxii, 137.
- , BOX-, = *Negundo aceroides*, Kansas. xxix, 451.
- Elderberry**, RED, = *Sambucus racemosa*; — W., WHITE, = *S. glauca*, California. xxvii, 192.
- Electric LIGHT**, prep. of carbon points; effects of var. salts, Carré. xxvi, 153.
- Electrolysis of ALKALOIDS**, deductions, Bourgoin. xix, 223.
- Electuary of CAOUTCHOUC**, Varick. xxii, 60.
- LAXATIVE, Ferrand. xxx, 68.
- PUMPKIN SEED, Cadenberg. xxx, 68.
- E SENNA, Ph. German (glycerin for syrup) Hager. xxiii, 49—xxv, 400.
- see also CONFECTIONS.
- Elektron** (amber), etymology, Landerer. xxvi, 472.
- Elements**, are all compounds of hydrogen, Lockyer. xxviii, 211.
- Elemi**, chemistry, Flückiger. xxiii, 216—behavior to reagents, Hirschsohn. xxvi, 453—solubility, Sacc. xix, 310; in eucalyptus oil, Osborne. xxvii, 234.
- fr. *Canarium commune*, India. xxiv, 196.
- of OLD WRITERS is *Luban mati* (meyeti) = *Boswellia Frereana*, Flückiger. xxvi, 296.
- LIBERIA, (an *Icica*) Holmes. xxvii, 261.
- , MANILLA, cont. bryoidin and breidin, Baup. xxiii, 216.
- MEXICAN, fr. *Elaphrium elemiferum*. xxiv, 195.
- Elettaria CARDAMOMUM**, cult. at Mysore, Elliott. xxvi, 193. See also **CARDAMOM**.
- Elhet Lehode** = *Asphodelus tenuifolius*, Morocco. xxiv, 114.
- Elia** = Jafferabad aloes. xxv, 126.
- Elixirs**, Diehl. xxi, 139—Gardner. xxviii, 439—Hancock. xxi, 91, 119—Newark Ph. Association. xix, 162—Eberbach. xx, 271.
- See also COMMITTEE.
- discussion: xx, 80; xxi, 91; xxii, 559; xxiii, 784.
- coloring (cudbear and caramel) Wilder. xxiii, 50—commercial, amount of alkaloids, Eberbach. xx, 264.
- ACID SALICYLIC, Wolff. xxix, 66.
- AMMON. VALERIAN, Eberbach. xx, 273—Fairthorne. xxix, 65—Gardner. xxviii, 450—Hancock. xxi, 122—Moore. xxiv, 70—Rother. xxi, 160—Committee of 1875. xxiii, 491.
- AMMON. and QUINIA VALERIAN., Gardner. xxviii, 450—Hancock. xxi, 122—Committee of 1875. xxiii, 491.
- AURANT. COMP., Enders. xxv, 67—Rother (percolates drugs ins ead of using extr.) xxv, 68.
- BARK, see ELIX. CALISAYA and EL. CINCHONA.
- BISMUTH and AMMON. CITRATE, Hancock. xxi, 121—Gardner. xxviii, 444—Committee of 1875. xxiii, 491.
- BLACKBERRY, Fairthorne. xxx, 73—Gardner. xxviii, 444.
- BOLDO, Verne. xxiii, 50.
- CALC. BROMID., Gardner. xxviii, 444.
- CALISAYA, see also ELIXIR CINCHONA.
- CALISAYA, Diehl (duplex). xxx, 72—Eberbach (unbleached alkal.) xx, 272—Gardner. xxviii, 445—Hancock. xxi, 120—Main. xxvii, 72—Committee of 1875. xxiii, 490.
- CALISAYA FERRATED, Eberbach. xx, 272—Gardner. xxviii, 445—Hancock. xxi, 121—Main. xxvii, 73. See also ELIXIR CINCHONA FERRATED.
- CALISAYA IRON and BISMUTH, Gardner. xxviii, 445.
- CALISAYA IRON, BISMUTH and STRYCHNIA, Gardner. xxviii, 446.
- CALISAYA, IRON, PEPSIN and BISMUTH, Gardner. xxviii, 446.
- CALISAYA IRON and STRYCHNIA, Eberbach. xx, 272.
- CALISAYA and PROTOXIDE IRON. xxvii, 73.
- Elixir, CALISAYA, PROTOXIDE IRON and BISMUTH.** xxvii, 73.
- CALISAYA FERROPHOSPH., Main. xxvii, 73.
- CALISAYA and HYPOPHOSPHITES, Diehl. xxx, 72.
- CALISAYA and HYPOPHOSPH. with STRYCHNIA, Diehl. xxx, 73.
- CAMPHOR, MONOBROMATED, Munday. xxv, 69—Dambier. xxv, 69.
- CAMPHOR. MONOBROM. COMP. (croton chloral). xxvi, 93.
- CASCARA, Coit. xxix, 66—Kennedy. xxviii, 432.
- CASCARA COMP., Coit. xxix, 66.
- CATHARTIC COMP. xxiv, 70.
- CHLOROFORM COMP., Mc. Nutt. xxix, 66. See also CHLORODYNE.
- CINCHONA, see also ELIXIR CALISAYA.
- CINCHONA, Maisch. xix, 163—Moore. xix, 352—Wilder. xxiii, 50.
- CINCHONA FERRATED, Moore. xix, 352—Wilder. xxiii, 50. See also EL. CALIS. FER.
- CINCHONA, IRON and BISMUTH, Moore. xix, 352.
- CINCHONA, IRON and STRYCHNIA, Gardner. xxviii, 446—Moore. xix, 352.
- CINCHONA and IRON CHLORIDE, Seay. xix, 163.
- CINCHONA COMP., Hancock. xxi, 122—Wilder. xxiii, 50—committee of 1875. xxiii, 490.
- CINCHONA COMP. with IRON, Hancock. xxi, 121—Wilder. xxiii, 50.
- CINCHONIA FERRATED, Rother. xxi, 160.
- CINCHONIA COMP., Rother. xxi, 159.
- CINCHONIA and STRYCHNIA FERRATED, Rother. xxi, 160.
- CINCHONIDIA, IRON and STRYCHNIA, Gardner. xxviii, 446.
- COCA. xxv, 69—Gardner. xxviii, 446—Kennedy. xxvi, 766.
- CORYDALIS COMP., Gardner. xxviii, 446.
- DIGESTIF DE PEPSIN, Grimault et Cie, Hager. xix, 232.
- GENTIANA FERRATED, Eberbach. xx, 273—Gardner. xxviii, 447—Hancock. xxi, 124—Dé Puy. xxx, 74—Remington. xxii, 65—Rother. xxi, 160—Committee of 1875. xxiii, 492.
- GLYCYRRHIZA, AROMATIC, Kennedy. xxv, 68—Remington. xxv, 68; xxvi, 765—xxix, 65.
- GUARANA, Gardner. xxviii, 447—Kennedy. xxiv, 70—Committee of 1875. xxiii, 492.
- HÆMATOXYLI, Fairthorne. xxx, 73.
- HOPS, Gardner. xxviii, 447—Kinports. xxvi, 93—Moore. xxiv, 69—Committee of 1875. xxiii, 492.
- IODO-BROMIDE CALCIUM COMP., Lyons. xxiii, 521.
- IRON CITRATE, Hancock. xxi, 121.
- IRON CITRO-LACTATE, Dondé. xxi, 161—Moore. xix, 351.
- IRON HYPOPHOSPHITES, Diehl. xxx, 71, 72.
- IRON LACTATE WITH PEPSIN, Moore. xix, 352.
- IRON PHOSPHATE. xxvii, 74.
- IRON PROTOCHLORIDE, Fairthorne. xxix, 67.
- IRON PROTOXIDE. xxvii, 73.
- IRON PYROPHOSPHATE, Gardner. xxviii, 449—Hancock. xxi, 121—Long. xxi, 161—Committee of 1875. xxiii, 491.
- IRON and QUINIA HYPOPHOSPHITE, Diehl. xxx, 72.
- IRON, QUINIA and STRYCHNIA HYPOPHOSPHITE, Diehl. xxx, 72.
- IRON, QUINIA and STRYCHNIA PHOSPHATE, Gardner. xxviii, 449—Moore. xix, 351.
- IRON PROTOXIDE and QUINIA. xxvii, 73.
- IRON, QUINIA and STRYCHNIA PYROPHOSPHATE, Gardner. xxviii, 449—Hancock. xxi, 123—Committee of 1875. xxiii, 492.
- LAXATIVE, Gardner. xxviii, 447.
- NUX VOMICA, Davidson. xxvi, 93.
- ORANGE COMP., Gardner. xxviii, 448.
- PANCREATIN, Mattison. xxii, 65.
- PEPSIN, Diehl. xxi, 140—Gardner. xxviii, 448—Hancock. xxi, 122—Grimault and Cie. xix, 232—Hottot-Boudault, Hager. xix, 232—Mialhe, Hager. xix, 232.
- PEPSIN and BISMUTH, Gardner. xxviii, 448—King. xxi, 162; xxviii, 46—Scheffer. xxi, 161.

- Elixir, Pepsin, Bismuth and Calisaya**, Gardner. xxviii, 448.
- **PEPSIN, BISMUTH and STRYCHNIA**, Gardner. xxviii, 448—Moore, xix, 350
- **PEPSIN, BISMUTH, STRYCHNIA and IRON**, Gardner. xxviii, 449.
- **PEPTONE**, Pettit. xxx, 74.
- **PHOSPHORUS**, George. xxx, 74—Luhn. xxiii, 50.
- **PHOSPHORUS, QUINIA and STRYCHNIA**, George. xxx, 74.
- **PODOPHYLLI COMP.**, Schafer. xx, 224.
- **POTASSII BROMIDI**, Gardner. xxviii, 445—Hancock. xxi, 124—Moore. xix, 351—Committee of 1875. xxiii, 491.
- **QUEBRACHO**, Burgos. xxviii, 47.
- **QUINIA, BISMUTH and STRYCHNIA**, Sørensen. xxiii, 516.
- **QUINIA and CINCHONIA SULPH.**, with IRON CITRATE, Committee of 1875. xxiii, 493.
- **QUINIA and CINCHONIA SULPH.** with IRON and BISMUTH CITRATE, Committee of 1875. xxiii, 493.
- **QUIN. and CINCHONIA SULPH.** with IRON and STRYCHNIA CITRAT., Committee of 1875. xxiii, 493.
- **QUINIA and TARAXACUM**, Long. xxi, 161.
- **RED**, Hancock. xxi, 120—Wilder. xxiii, 50—Committee of 1875. xxiii, 490.
- **RHAMNUS PURSHIANA**, see ELIXIR CASCARA.
- **RHUBARB**, Carlo. xxix, 66.
- **RHUBARB and MAGNESIA**, Gardner. xxviii, 449.
- **RHUBARB and MAGNESIA, AROMATIC**. xxv, 69.
- **SENNA**, Diehl. xxiv, 70.
- **SENNA COMP.**, Diehl. xxiv, 70.
- **SIMPLE**, Eberbach. xx, 271—Hancock. xxi, 120—Moore. xix, 350; xxix, 65—Remington. xxii, 64—Committee of 1875. xxiii, 490.
- **SODII BROMIDI**, Gardner. xxviii, 445—Moore. xix, 351.
- **SUMBUL COMP.**, Hancock. xxi, 122.
- **TAR**, Magnes-Lahens. xxiii, 51.
- **TARAXACI COMP.**, Gardner. xxviii, 450—Moore. xix, 350.
- **THUJA**, Lawes. xxvi, 93.
- **WILD CHERRY (comp.)**. xxiii, 51.
- Elliott, W.** Address of welcome, at Toronto. xxv, 493.
- Ellis, Evan T.** xix, 101, 102, 106.
- Elm, SLIPPERY**, adult. of powd. (rye flour). xxi, 479, 481; xxx, 576—drug market. xix, 401; xxi, 435; xxii, 643; xxv, 335—prop. of tannin, Johanson. xxvi, 555.
- Elodea CANADENSIS**, induces butyric ferment. in sol. of cane sugar, Schützenberger. xxiii, 371.
- Elod-elhmar**=*Armeria mauritanica*, Morocco. xxiv, 114.
- Embelia MICRANTHA**, Mauritius. xxiv, 741.
- **RIBES**, India, descript., Dymock. xxv, 153.
- Emblica OFFICINARUM**, Turkestan. xxi, 260—India. xxiv, 718.
- Embothrium**, spec., Chili. xxiv, 765.
- Embryopteris GLUTINIFERA**, India. xxiv, 725.
- Emetin**, act. of bichrom. mixture, chlorin. lime, Hamlin, Jr. xxix, 324—estimat., Thresh. xxviii, 320—prep., Glénard. xxiv, 365; Podwissotzki. xxviii, 338; Lefort and Wertz. xxvi, 601—fr. deposit in wine of ipecac. Brownen. xxvii, 517—test (chlorin. lime), Power. xxvi, 601; (mur. ac., pot. chlor.), Snelling. xxviii, 338—yield, Stewart. xxv, 162.
- compd. with BILIARY acids, Arbre. xxi, 371.
- **MURIATE**, Glénard. xxiv, 365.
- Emodin** in old frangula bark, Liebermann and Waldstein. xxv, 320.
- Emplastrum**, see also PLASTER.
- **AMMONIACI C. HYDRARGYRO**, Ph. Br., Gerrard. xxiii, 52.
- **BELLADONNA**, Ph. Br., Gerrard. xxiii, 52.
- **CALIFACIENS**, Ph. Br., Gerrard. xxiii, 52.
- **CANTHARIDINI ORDINARIUM**. xxx, 65.
- **CANTHARIDINI PERPETUUM**. xxx, 65.
- **CFRATI SAPONIS**, Ph. Br., Gerrard. xxiii, 52.
- **CERUSSAE**, Jungclaussen. xxiii, 54.
- **DIACHYLON**, Voraceck. xxx, 71.
- **FERRI**, Ph. Br., Gerrard. xxiii, 52.
- **HYDRARGYRI**, Ph. Br., Gerrard. xxiii, 53.
- **OPII**, Ph. Br., Gerrard. xxiii, 53—Shuttleworth. xxiv, 181.
- Emplastrum, PICIS**, see PLASTER, TAR.
- **PLUMBI**, see PLASTER, LEAD.
- **PLUMBI IODIDI**, Ph. Br., Gerrard. xxiii, 53.
- **RESINAE**, Ph. Br., Gerrard. xxiii, 53.
- **SAPONATUM**, Jungclaussen. xxiii, 54.
- Empleurum SERRULATUM**, Holmes. xxvi, 252.
- Emsleh-ander**=*Verbascum sinuatum*, Morocco. xxiii, 149.
- Emulsin**, is not precip. by acids nor rendered inactive by alc., Heuschen. xxi, 402.
- Emulsions, APPARATUS**, Alvergniat. xxvi, 124—Hartwig. xxiv, 85.
- **OILY**, Bedford (glyc., acac.). xxi, 163—Collier (quillaya, serena). xxviii, 6—Cotzhausen. xxiv, 122—Diehl. xxi, 163; xxx, 93—Dilg. xxvii, 97—Gerrard. xxix, 81—Graff. xxix, 79—Gregory. xxiv, 485, 6—Hogan. xxiv, 86—Husted (Irish moss). xxix, 80; xxx, 95—Lloyd. xxx, 93—McDonnell (quillayin). xxx, 97—Martin. xxiv, 85—Neynaber. xxvi, 123—Wharton. xxiv, 681—(with quillaya, lime water, tragac.). xxix, 80.
- **OILY**, blue react. with tinct. guaiaci, Arnold. xxx, 542.
- **VOLATILE OILS**, Forbes (in the bottle). xxi, 134.
- of **RESINS**, Glasse. (ignited alcohol). xxiv, 86—Greenish (sugar milk, alc., acac.). xxv, 91—Phar. Soc. Paris (quillaya). xxv, 92.
- **ALMONDS**, Ebert. xxv, 557—Gregory. xxv, 412—Reynolds (concentrated). xix, 149.
- **BALSAM PERU**, Gerrard. xxix, 82.
- **oil CADE**, Phar. Soc. Paris. xxv, 92.
- **CARNIS**, Kemble. xxiii, 78.
- **CASTOR OIL**, Collier (QUILLAYA). xxviii, 60—Diehl (ACAC.). xxx, 94—Ezell (acac.). xxvii, 94—Gerrard (acac.). xxix, 82—George (GLYCONIN). xxx, 96—Heinitsh (glyconin). xxix, 83; xxx, 98—Holmes (acac.). xxii, 378; xxiii, 78—Husted (IRISH MOSS). xxx, 96—McDonnell (QUILLAYIN). xxx, 97.
- **CHLOROFORM**, Gaillard (milk). xxv, 92.
- **CHIAN TURPENTINE**, Gerrard (ether, acac.). xxix, 83.
- **COD-LIVER OIL**, with ACACIA: Diehl. xxx, 93, 4—Eisner. xxix, 81—Gerrard. xxix, 81—Moffit. xxi, 164—with EGGS, Hassard. xxii, 65—with GLYCONIN. xxiv, 30—Close. xxiii, 79; xxiv, 87—McElhenie. xxiv, 86—with IRISH MOSS, George. xxx, 96—Husted. xxx, 95—with LAMINARIA SACCHARINA, Wheeler. xxx, 97—with PANCREATIN, Hamm. xxiii, 469—Mattison. xxii, 66—with QUILLAYA. xxix, 80—Collier. xxviii, 60—with QUILLAYIN, McDonnell. xxx, 97—with TRAGACANTH, Gilmour. xxvii, 29, 92—Rice, Jr. xxii, 65—Robertson. xxi, 163.
- **COD-LIVER OIL** with HYPOPHOSPHITES, Diehl. xxx, 94—Grazer. xxx, 97—Griffith. xxix, 429—Husted. xxx, 95—McDonnell. xxx, 97—Monad. xxiii, 80—Zoeller. xxx, 96.
- **COD-LIVER OIL** with LACTO-PHOSPHATE LIME, Chiles. xxi, 164—Diehl. xxx, 94—Eisner. xxix, 81—Moffit. xxi, 164—Shinn. xxi, 164.
- **COD-LIVER OIL** with PHOSPHATE LIME, Diehl. xxx, 94—Fairthorne. xxviii, 60.
- **COD-LIVER OIL** with PHOSPHORUS, Squibb. xxiv, 477.
- **COD-LIVER OIL** and PYROPHOSPHATE IRON, Moffit. xxi, 165.
- **COD-LIVER OIL** with WILD CHERRY, Diehl. xxx, 94—Eisner. xxix, 81.
- **COPAIBA**, (acac.), Gerrard. xxix, 82—Polk (potassa). xxi, 163—Collier (quillaya). xxviii, 60—Phar. Soc. Paris (quillaya). xxv, 92.
- **COPAIVA RESIN**, Gerrard (alc., acac.). xxix, 82—Balkwill (oil almond, acac.), xxv, 92—Collier, (quillaya). xxviii, 60.
- **GUAIAC**, Collier. xxviii, 60.
- **HYDROCYANATE**, Ph. Sweden, Oldberg. xxi, 133.
- **MALE FERN** (oleo resin), Mayet. xxx, 98—Limousin. xxx, 98—Collier. xxviii, 60—McDonnell. xxx, 97.
- **MEAT**, Kemble. xxiii, 78.
- **PANCREATIC** of SOLID FATS, Mattison, xxii, 66.
- **PUMPKIN SEED**, Desnos. xxiv, 86.
- **PHOSPHORETTED OIL**, Redwood. xxiii, 78.
- **TARNIFUGE**, Desnos. xxiv, 86.

- Emulsion, TAR, Roussin.** xxi, 165—Gerrard. xxix, 84—Phar. Soc. Paris. xxv, 92.
 — **TOLU, Collier.** xxviii, 60—Phar. Soc. Paris. xxv, 92.
 — **OIL TURPENTINE, Forbes.** xxi, 134—Gerrard. xxix, 82—Genois (soap). xxvi, 125—Postans. xxvi, 439—Collier. xxviii, 60.
Enamel for cast and wrought iron, Raetz. xxvii, 128—for cooking-vessels, Tatlock. xxv, 56.
 — See also **GLAZE.**
Encens MARBRE=Galipot, France. xxvi, 324.
Enema, OPII, Ph. Br., strength, Shuttleworth. xxiv, 181.
Enfleurage process, France. xxiv, 275.
Entada PUSÆTHA, India, descript., Dymock. xxiv, 193.
Entertainments, costs in Europe. xxix, 529—discussions. xx, 78; xxx, 643, 4.
 — **Atlanta.** xxvi, 920—**Baltimore.** xviii, 126—**Boston.** xxiii, 846—**Cleveland.** xx, 112—**Indianapolis.** xxvii, 811—**Kansas City.** xxix, 530—**Louisville.** xxii, 574—**Niagara.** xxx, 671—**Philadelphia.** xxiv, 698—**Richmond (Va.).** xxi, 110—**St. Louis.** xix, 127—**Saratoga.** xxviii, 577—**Toronto.** xxv, 579.
Eone=Didelphis cancrivora, Brazil. xxvi, 216.
Epazote=Chenopodium umbrosioides, Mexico. xxiv, 772.
Eperva FALCATA, Guiana. xxviii, 186.
Ephedra ANDINA, Chili. xxiv, 766.
 — **ANTISYPHILIGICA, Arizona.** xxvii, 285.
 — **FLAVA, China.** xxiv, 752.
Epicauda CINEREA. xxiv, 505, 8.
 — **VITIATA.** xxiv, 505, 8.
Epicea=Abies excelsa, France. xxvi, 323.
Epilobium ANGUSTIFOLIUM, active principles of root. Biddle. xxv, 434.
Epipremnum MIRABILE, Fiji. xxx, 147.
Epsom salt, see MAGNESIUM SULPHATE.
Equisetaceae. xxv, 122; of Kansas. xxix, 444.
Equisetum ARVENSE;—E. HYEMALE, Kansas. xxix, 444.
 — **MAXIMUM, p. c. of ashes; cont. alumina, Church.** xxiii, 126—**E. ROBUSTUM, Kansas.** xxix, 444.
Eragrostis PURSHII, Utah. xxvii, 137.
Erasine, oil fr. Pinus sabiniana, California. xxvii, 385.
Erbia, equivalent; spectrum, Delafontaine. xxvii, 343—of previous authors consists chiefly of ytterbia, Wilson. xxvii, 345.
Erbium and (13) salts, Cleve. xxiii, 284—fluorescence, Soret. xxvii, 346.
Erechthites HIERACIFOLIA as weed in peppermint plantations. xxx, 325—Kansas. xxix, 442.
Eremocarpus SETIGERUS, California. xxvi, 698—descript. and uses, Fiske. xxx, 250.
Ergot. xxiv, 33—activity does not depend on any one single principle, Squibb. xxi, 637; Schaefer. xxix, 118—adult. xxi, 203, 479; xxx, 141; of powd. xxx, 576; xxiv, 405—chemical history, Mitchell. xxiv, 466—active constituents, Dragendorff and Podwissotzky. xxiv, 119; Herrmann. xviii, 273—active constituents derived from rye, Buchheim. xxiv, 117; gluten of rye finally changed into leucin, ammonia and trimethylamin, Buchheim. xxiv, 118—contains cholesterin, Stahl and Höhn. xix, 262; lactic ac., mycose, Buchheim. xxiv, 117—drug market. xx, 122; xxii, 625; xxv, 338, 348; xxvi, 655; xxvii, 558, 560; xxviii, 371; xxix, 372; xxx, 466—estimat., Hoffmann. xxvii, 135; Pöhl. xxx, 142—danger of ergotism seems to be overrated, Squibb. xxi, 643—ought to be gathered in August and September, Stoddart. xxviii, 101—growth and development, Stoddart. xxviii, 101—hypodermic solut., Squibb. xxi, 645, 6—insects not the only cause of deterioration, Martin. xxx, 141—preservation (benzoin), Mourrut. xxvi, 178; (charcoal), Ducros. xxiv, 120; (dry; exclus. of air), Hirschberg. xix, 262; (depriv. of fixed oil), Dragendorff. xxv, 119; Ficinus. xxii, 95; Werner. xxx, 142; (ether and heated), Perret. xxx, 141—test of quality (oil of fresh is neutral), Bernbeck. xxx, 142.
Ergot of GRAMINACEÆ, Wilson. xxiv, 120—comparat. examinat. desirable, Squibb. xxi, 89.
Ergotin prep., Mitchell. xxiv, 465; Schmidt. xxix, 7.—contaminated with copper, Stufen. xxviii, 78—dialyzed, Wernich. xxii, 95—hypodermic inject., Martin. xxvi, 97; Powers. xxvii, 93.
 — **BONJEAN'S.** xxiv, 465—**Carles.** xxvi, 96—**Castillon.** xxviii, 51—**Diehl.** xxix, 69—**Mercein.** xxii, 57—**Zellhöfer.** xxv, 404.
 — **BUCHHEIM.** xxiv, 117, 118.
 — **MERCK'S, Mercein.** xxiii, 517.
 — **WENZEL'S** ident. with his ecbolina, Dragendorff and Podwissotzky. xxiv, 120.
 — **WIGGERS'.** xxiv, 465.
Ergotin, Tanret. xxiv, 365; xxvi, 604; xxv, 27—does not cont. Sclererythrin, Tanret. xxv, 118—prep., Blumberg. xxvii, 135—physiolog. resembles picrosclerotin, Blumberg. xxvii, 131—is not a definite substance, Dragendorff and Podwissotzky. xxiv, 120.
Ericaceae. xxi, 223; xxii, 114; xxiii, 164; xxiv, 140; xxv, 154; xxvi, 221; xxvii, 175; xxviii, 142; xxx, 188; of California. xix, 303; Kansas. xxix, 444; Mexico. xxiv, 774.
 — analysis, Smith. xxx, 188.
Ericin, color fr. poplar wood. xxviii, 355.
Erigeron AFFINE, Mexico. xxiv, 775—**F. CANADENSE.** xxx, 325 note, 327; in Kansas. xxix, 442—**E. PHILADELPHICUM, Kansas.** xxix, 442—**VISCOSUM, Greece.** xxiv, 143.
Eriodictyon CALIFORNICUM. xxvi, 698; xxvii, 613—account, Wellcome. xxiv, 134—analysis, Mohr. xxvii, 336, 9; Holzhauser. xxix, 141.
 — **GLUTINOSUM, California.** xix, 304.
Erioglossum EDULE, China. xxvi, 253.
Eriotrichium GNAPHALOIDES, Chili. xxiv, 766.
Erodium CICUTARIUM, California. xix, 300; xxvii, 604.
Erukkam (—ku)—Calotropis gigantea; C. procera, India. xxviii, 139.
Erva DE IBBISI, —Satureja Juliana, Sicily. xxviii, 127.
 — **DO RATO=Palicourea Marcgravü, Brazil.** xxiii, 121.
Ervum ERVILIA, account, Southall. xxviii, 187.
 — **LENS, see LENTIL.**
Eryngium AQUATICUM, substit. by Liatris spicata. xxiii, 501.
 — **PETIOLATUM, California.** xix, 301.
 — **TRICUSPIDATUM, Morocco.** xxiv, 114.
 — **YUCCÆFOLIUM, Kansas.** xxix, 452.
Erysimum ASPERUM, California. xix, 299—**E. cheiranthoides, Kansas.** xxix, 443.
Erysipelas, tea poultice, Vail. xxiv, 65.
 — **PLANT—Tiaridium indicum, Liberia.** xxvii, 165.
Erythræa CENTAURIUM, Greece. xxiv, 136.
 — **CHILENSIS** cont. erythrocentaurin, Méhu. xix, 287.
 — **MUHLBERGII, California.** xix, 305—**E. STRICTA, Mexico.** xxiv, 773—**E. VENUSTA, California.** xxvii, 607.
Erythrite and oxalic ac. yield formic ac., Lorin. xxii, 250; xxiv, 318.
Erythrium INDICUM, Mauritius. xxiv, 741.
Erythrocentaurin found in Erythræa chilensis, Méhu. xix, 287; in Sabbatia angularis, Hunneker. xix, 287.
Erythrocephalein, fr. ipecac, Podwissotzky. xxviii, 338.
Erythrodextrin, Musculus and Gruber. xxvii, 439—**Musculus and Nageli.** xxx, 367.
Erythronium DENS CANIS, Siberia, analysis of bulb, Dragendorff. xxvii, 142.
 — **GRANDIFLORUM, California.** xix, 307.
Erythrophloeum GUINEENSE, Liberia, descript., Holmes. xxvi, 169—alkaloid, Hardy; Gallois. xxv, 217.
Erythrophleia, Hardy; Gallois. xxv, 217—xxx, 473.
Erythrophyll (of Bougarel), Hoppe-Seiler. xxviii, 351.
Erythroxyllaceæ. xxiii, 197; xxiv, 173; xxv, 188; xxvi, 268.
Erythroxylin (of Percy)=cocaine. xxvi, 765.
Erythroxylin COCA, descript., Steele. xxvi, 774. See also **COCA.**
 — **HYPERICIFOLIUM.** xxvi, 774—**E. TUBEROSUM.** xxv, 189; xxvi, 774.

- Escharotica.** See CAUSTICS.
- Eschscholtzia CALIFORNICA.** xix, 299.
- Escoba dura,** Arg. Republ. xxiv, 764.
- Escorzonera,** Arg. Republ. xxiv, 763.
- Esenbeckia FEBRIFUGA,** Brazil (false angostura). xxiii, 190—analysis, am Ende. xix, 268.
- Esenbeckina,** am Ende. xix, 269.
- Eserin** (of Duquesnel) contains no calabarin, Harnack and Witkewsky. xxvi, 293—xxviii, 371; xxx, 473—prep., Phar. Soc. Paris. xxv, 312.
- **HYDROBROMATE,** Duquesnel. xxiii, 427—Phar. Soc. Paris. xxv, 313.
- **SALICYLATE.** xxix, 372.
- **SULPHATE.** xxv, 313.
- see also **PHYSOSTIGMIA.**
- Espinillo,** Arg. Republ. xxiv, 764.
- Espinosilla**—*Hoitzia coccinea*, Mexico. xxiv, 773.
- Esprit DE VIE DE MATTHIOLE.** xxix, 95.
- Essence OF BEEF,** London, analysis, Tscheppe. xxviii, 54.
- Essence OF GINGER, SOLUBLE,** Thresh. xxvii, 115; xxviii, 83—Proctor. xxvii, 115.
- of **LICORICE,** Juehling. xxviii, 76.
- **PEPSIN,** Schering. xix, 233.
- **RUSCI.** xxix, 102.
- Essences, CULINARY,** Ebert. xix, 163.
- **FLAVORING.** Ebert. xix, 163.
- see also under **EXTRACTS.**
- , **FRUIT** (fr. the fruits themselves). xxx, 110.
- **NATURELLES** (fr. the flowers directly), Roure-Bertrand. xxiv, 824.
- Estafiate**—*Artemisia mexicana*, Mexico. xxiv, 774.
- EthaliuM SEPTICUM,** cont. trehalose, Muntz. xxiii, 122.
- Ether,** test for acet. acid, Vrij. xxi, 328—act. upon resins, gum-resins, balsams, Hirschsohn. xxvi, 453—test for alc. (potassa), Boettger. xxi, 327; (gun cotton). xix, 344; (glycerin), Frederking. xxi, 327—dissolves alkalies and their carbon., Skey. xxvi, 477—adult. xix, 344.
- **ANHYDROUS,** dissolves salts which are insoluble in ordinary ether, Skey. xxvi, 477.
- and chloroform mix with elevat. of temp., Greene. xxvii, 409—comparat. strength of commercial, Bedford. xxiii, 722—drop equivalent, Talbot. xxix, 34—freezing point, Franchimont. xxvi, 476—hydrate, crystals, Tanret. xxvii, 406—yields no iodoform, Hager. xxx, 346; except when in contact with certain bodies, Lieben. xxi, 328—pure does not decompose iodides, Vrij. xxi, 328—prep. of perfectly pure exceedingly difficult, Lieben. xxi, 327—separation fr. aqueous liquids, Warden. xxx, 340—theory, Friedel. xix, 242—test for water (bisulph. carbon.), Boettger. xxi, 327; (sulphomolybdic ac.), Mann. xxix, 292; (carbolate potassium), Romei. xix, 242.
- **ACETIC,** test for alc. (glycerin), Frederking. xix, 243; xxi, 327—continuous process, Pabst. xxix, 294—detect. of free acid (litharge), Bouvier. xxix, 294—yields iodoform, Hager. xxx, 346—manufact. on the large scale. xxx, 346.
- **BENZOIC** in oil of ylang-ylang, Gal. xxix, 191.
- **BUTYRIC,** Thenius. xxvii, 460—contamination. xxi, 489.
- **CHLORIC** (mono-, di-, tri-, tetra-, penta-). xxvi, 474.
- **CHLOROFORMIC.** xxvii, 317.
- **DI-ETHYL-SALICYLIC,** Götting. xxvi, 489.
- **FLUORNIC,** Barbier. xxiv, 301.
- **FLUOREN-ACETIC,** Barbier. xxiv, 301.
- **FORMIC,** Trimble. xxix, 294.
- **HYDRIODIC,** see **ETHYL, IODIDE.**
- **HYDROBROMIC,** apparatus, Remington. xxviii, 277—as anaesthetic, Rabuteau. xxv, 276—in hysteria. xxx, 341—formation depends on temp., Villiers. xxix, 293—poisonous, Ott. xxix, 293—preparation: Greene (dil. sulph. ac., alc., brom. pot.) xxvii, 406; Hoffmann (amyl brom., alc.) xxv, 455; Löwig (alc. brom.) xxv, 455; Personne (amorph. phosph., brom., alc.) xxv, 455; Remington (amorph. phosph.) xxv, 454; Serullas (phosphorus). xxv, 455; Vrij (brom. pot., alc., sulph. ac.) xxv, 455; Wolff (ferrous bromide). xxviii, 276—is more stable than generally supposed, Wolff. xxviii, 277.
- Ether, MANNITE,** Vignon. xxv, 290.
- **METHYLIC,** Tellier. xxv, 277—for artif. ice, Erlenmayer and Kriechbaum. xxiii, 350—water absorbs 600 volumes. xxiii, 350.
- **METHYL-ACETIC,** (continuous process) Pabst. xxix, 294.
- **METHYL-ETHYLIC** as anæsthetic, Richardson. xviii, 243.
- **MONETHYLSALICYLIC,** Götting. xxvi, 489.
- **NITRIC** and **NITROUS,** (by sulphovinic acid) Champion. xxiii, 347; dangerous, Phipson. xxiii, 347.
- **NITROUS,** estimat., Rosenblatt and Feldhaus. xxvi, 478; Remington. xxviii, 67—prep., Williams. xxvi, 486—solubility in saturat. sol. chlor. calc. and chlor. sod., Mill. xxvi, 482.
- **OXYCHLOROCARBONIC,** Paterno. xxvii, 317.
- **OZONIC.** xviii, 207.
- **PETROLEUM,** see **PETROLEUM ETHER.**
- **PHOSPHORATED.** xxvii, 92.
- **SULPHURIC,** see **ETHER.**
- see also **ETHYL.**
- Ethereal SOLUTIONS** evaporated in tall vessels (by siphon) Vulpius. xxiii, 109.
- Etherification** by muriat. ac. (theory) Friedel and Mohr. xviii, 248.
- Ethidene, BICHLORIDE,** Clover. xxix, 296.
- Ethyl-ACETYLEN** ident. with crotonylen, Prunier. xxii, 213.
- **BROMIDE,** see **ETHER, HYDROBROMIC.**
- **CHLORIDE.** xxvi, 474—act. of chlorine (8 compounds) Taube. xxix, 292.
- **DIMETHYL-CARBINOL** xxvii, 413.
- **EUGENOL,** Wassermann. xxiv, 280.
- **GLYCOLATE,** Norton and Tschernick. xxvii, 454.
- **IODIDE** ("home made") Genois. xxvii, 407.
- **ISÆTHIONIC.** xxx, 342.
- **ISOVALERIANATE,** Schmidt. xxvii, 459.
- **MERCURIC, CHLORIDE** of Prümers. xxi, 328—does not precip. albumen, Schering. xxi, 329.
- **METHYL-ETHYLEN.** xxvii, 414.
- **NITRITE,** see **ETHER, NITROUS.**
- **PEROXIDE,** Berthelot. xxix, 292; xxx, 341.
- **PYRIDIN** fr. cinchonia, Wischnegradsky. xxviii, 331.
- **SULPHATE,** Villiers. xxix, 295—normal, Stempnevsky. xxx, 342.
- **TRICHLOROLACTATE,** Wallach. xxiv, 292.
- see also **ETHER.**
- Ethylene.** xxviii, 371—act. of ozone, Mailfert. xxx, 259; of heated platin. and pallad. coil, Coquilhon. xxii, 208.
- **CHLORIDE,** comp. and boiling point. xxix, 293—yields no iodoform, Hager. xxx, 346.
- **PERCHLORATE,** Bourgoin. xxiii, 345.
- **PERCHLORIDE,** Bourgoin. xxiv, 287.
- Ethyliden, BICHLORIDE.** xxviii, 371.
- **CHLORIDE.** xxvi, 473, 4—comp. and boiling point. xxix, 293.
- Eucalyn** in *Eucalyptus manna*, Berthelot. xxi, 250.
- Eucalyptol.** xxix, 372; xxiv, 805—as antizymotic, Binz. xxii, 221—constitution, Faust and Homeyer. xxii, 222.
- Eucalyptus** leaves in cigars for asthma, etc. xix, 276—in coryza, Rudolph. xxviii, 177—drug market. xxv, 352; xxviii, 371—100,000 million gallons of essent. oil in Australia, and hence the climate healthy, Bosisto. xxiii, 206—yield of essent. oil fr. the diff. species, Müller and Adams. xxvii, 233—yield of pearl-ash, Adams. xxvii, 234—microscop. exam. of bark, Möller. xxiii, 206.
- in Australia, Hoffmann. xxi, 245—in California. xxviii, 177.
- **AMYGDALINA,** descript. and yield of oil. xxi, 246, 7; xxvii, 233, 4.
- **CORYMBOSA,** descript. xxi, 248—in Queensland. xxiv, 741.
- **DUMOSA** yields manna. xxi, 250.
- **FISSILIS,** descript. xxi, 249.
- **GLOBULUS,** account, Hoffmann. xxi, 246, 8—analysis of leaves, Hartzler. xxv, 203; Homeyer. xxiii, 206—antimiasmatic in Algiers, Cuba, Cape of Good Hope. xxii, 146—constituents, Buchner; Weber. xviii, 287—as fever tree. xviii, 287;

Eucalyptus (*Continued*).

- Lockwood. xxvi, 279; in Austria, Brazil; Senftleben. xxvi, 279—in hospital wards. xxvi, 235—in malarial districts, Glover. xxiv, 188—against flies and mosquitoes. xxv, 203—literature, Köhler. xxii, 145—yield of oil, Bosisto. xxvii, 234—in Algiers, Playfair. xxvi, 279; and in France, Ullersperger. xxii, 146—in Brazil, Chernovicz. xxi, 250—in California. xxvii, 600—England. xxii, 146—Prussia. xxvii, 234.
- **GONIOCALYX**, descript. xxi, 246, 8—yield of oil, Bosisto. xxvii, 234.
- **LEUCOXYLON**, descript. xxi, 246, 8—yield of oil, Bosisto. xxvii, 234.
- **LONGIFOLIA**, descript. xxi, 249.
- **MACULATA**, Queensland. xxiv, 741.
- **OBLIQUA**, descript. xxi, 249—yield of oil, Bosisto. xxvii, 234.
- **ODORATA**, descript. xxi, 249.
- **OLEOSA**, descript. xxi, 247—yield of oil, Bosisto. xxvii, 234.
- **RESINIFERA**, descript. xxi, 246.
- **ROSTRATA**, descript. xxi, 246, 9—best adapted for malarial districts. xxvii, 234.
- **STUARTIANA**, descript. xxi, 246.
- **VIMINALIS**, descript. xxi, 250.
- Eucheuma SPINOSUM** yields Agar-Agar, India. xxiv, 725.
- Eugenia CHEKEN**. xxvii, 235—therapeutics, Borchers. xxviii, 177.
- **MAIRE**, New Zealand. xxiv, 737.
- **SPICULATA**, Chili. xxiv, 765.
- Eugenol**, constit. and prop., Wassermann. xxiv, 280.
- Eulalia JAPONICA**, Japan. xxviii, 100—descript., Holmes. xxviii, 104.
- Euonymin**, (alkaloid), prop., Miller. xxvii, 265.
- (eclectic) solubility, Parker. xxx, 128.
- Euonymus**, adult. of powd. bark. xxx, 577.
- **ATROPURPUREUS**, Kansas. xxix, 441—analysis, Miller. xxvii, 265.
- Eupatorin** (perfo., eclectic), solubility, Parker. xxx, 128.
- (glucoside), prop. Latin. xxix, 156.
- Eupatorium AGERATOIDES**, Kansas. xxix, 442.
- **AMARUM** (guaco). xxix, 158.
- **AYAPANA**, microscop. charact., Paschkis. xxix, 156—uses in India. xxiv, 141—descript., Dymock. xxv, 156—Mauritius. xxiv, 741.
- **COLLINUM**, Mexico. xxiv, 775.
- **GLUTINOSUM** (matico) So. America. xxiii, 221, 646.
- **PARVIFLORUM** (guaco). xxix, 158.
- **PERFOLIATUM**, analysis, Latin. xxix, 156; Parsons. xxviii, 146—in Kansas. xxix, 442.
- **PURPUREUM** in Kansas. xxix, 442.
- **VILLOSUM**, Jamaica. xxiv, 734.
- **VINCÆFOLIUM** (guaco). xxix, 158.
- Euphorbia**, SPURGE, Greece. xxvii, 266.
- **AMYGDALOIDES**, analysis of ash, Wittstein. xxiv, 200.
- **ANTIQUORUM**, India. xxviii, 193.
- **APIOS**, Greece. xxvii, 266.
- **CATTEMANDU**, India. xxiv, 719.
- **COROLLATA**, in Kansas. xxix, 445.
- **CRENULATA**, Calif. xix, 306.
- **CYPARISSIAS**, cont. luteinic ac., Hohn. xviii, 285.
- **DENDROIDES**, Greece. xxvii, 266.
- **HELIOSCOPIA**, Greece. xxvii, 266.
- **HYPERICIFOLIA** in Kansas. xxix, 445.
- **IPECAC.**, analysis, Dilg. xxv, 227—Petzelt. xxi, 259.
- **LATHYRIS**, analysis of seeds, Zander. xxvi, 305—physiolog. act., Sudour. xxx, 249.
- **LEPTOCERA**, California. xix, 306.
- **MACULATA**, Kansas. xxix, 445—Mexico. xxiv, 771.
- **NERVIFOLIA**, India, descript., Dymock. xxviii, 192—Japan. xxviii, 186.
- **NIVULIA**, India. xxviii, 193.
- **PEPLIS**, Greece. xxvii, 266.
- **PILULIFERA**, Australia. xxx, 473.
- **POLYCARPA**, Arizona. xxvii, 266.
- **PORTULACOIDES**, Chili. xxiv, 766.
- **PROSTRATA**, Kansas. xxix, 445.
- **PULCHERRIMA**, Mexico. xxiv, 771.

Euphorbia, RESINIFERA, India. xxviii, 193.

- **TERRACINA**, Morocco. xxiii, 222.
- **TIROCALLI**, behavior of resin to reagents, Hirschsohn. xxvi, 453—9—in India. xxvii, 193.
- **VILLOSA**, Central Europe. xxx, 250.
- Euphorbiaceae**. xviii, 285; xix, 293; xxi, 259; xxii, 158; xxiii, 222; xxiv, 200; xxv, 225; xxvi, 305; xxvii, 266; xxviii, 192; xxx, 249—of California. xix, 306; Kansas. xxix, 445; Mexico. xxiv, 771.
- Euphorbin** in *Euphorbia ipecac.*, Dilg. xxv, 227.
- Euphorbium**, behav. to reagents, Hirschsohn. xxvi, 453—9—active principle an anhydrid of an acid, Buchheim. xxii, 34—activity not due to euphorton but to euphorbic ac., Buchheim. xxii, 159—supply and cause of scarcity, Jackson. xxx, 249.
- Euphoria LITCHI**, descript. of fruit, China, Martin. xxx, 223.
- **PUNICEA**, China. xxx, 223.
- Eupitton**, fr. pittacal, Liebermann. xxv, 269.
- Eupurpurin** (eclect.) solubility, Parker. xxx, 128.
- Eurotin** for brewing, Japan, Atkinson. xxviii, 363.
- Eurotium ORYZÆ**, xxviii, 363.
- Euryale FEROX**, China. xxiv, 745.
- Euryangium SUMBUL**, descript. xxiv, 154—Wittmann. xxv, 171. See also **SUMBUL**.
- Eurycoma LONGIFOLIA**, India. xxvii, 169.
- Euryops RESIN**, behavior to reagents, Hirschsohn. xxvi, 453—9.
- Euterpe EDULIS** (So. America). xxvii, 273.
- Euxenia GRATA**, Chili. xxiv, 765.
- Evaporation**, NOT BEYOND A CERTAIN POINT, apparatus, Geyer. xxiii, 30—automatic gas-cut-off., Suess. xxix, 50—automatic balance regulator, Wagner. xxviii, 34—Zavaglia. xxi, 151.
- under **DIMINISHED PRESSURE**, Prescott. xviii, 205.
- **DISHES** hammered out of block-tin, Markoe. xxiii, 819—of papier-maché. xxx, 56.
- Evernia VULPINA**, yellow paint of Indians. xxvii, 285.
- Evodia FEBRIFUGA** (false angostura), Brazil. xxiii, 190.
- **GLAUCA**, Japan, cont. berberine, Martin. xxvii, 207; xxviii, 168.
- **RUTÆCARPA**, Japan. xxviii, 100—descript., Holmes. xxviii, 168.
- Excursions**, Colorado, New Mexico, Pike's Peak. xxix, 530.
- Exhibitions**, see **COMMITTEE** and **REPORT**.
- to be abolished, Wellcome. xxv, 570.
- Exogonium JALAPA**, name proposed by Baillon. xxii, 110.
- Exostemma CARIBÆUM**, descript. xxiv, 152.
- Explosive AGENTS**, mode of action. xix, 169.
- bodies and mixtures, list, Rice. xxvi, 89.
- compound, Violette (saltpetre, acet. sodium), xxi, 200.
- Extraction**, act. of currents, Lloyd. xxvii, 686, 695—of temperature, Lloyd. xxvii, 687.
- **APPARATUS** for volat. liquids, Gantler. xxix, 35—continuous, Thorn. xxx, 36. See **PERCOLATOR**.
- Extracts SOLID**, adulterated (cont. all chlorophyll and mucilagin. constit.). xix, 347—assay of alkaloidal, Thresh. xxviii, 320—for the American market (!!) Enders. xxv, 72—for dispensing (in pills), Wharton. xxv, 71—home-made, Saunders. xviii, 107, 182; xix, 468—in soft condition (surround by sulph. sod. cryst.), Martin. xxviii, 49—yield, xxi, 131; Danckworth. xxiii, 55; Saunders. xix, 468; Schwabe. xix, 145; Werner. xxi, 166.
- **ETHEREAL**, recovery of ether fr. residues, Rohn. xxvii, 76—made with **BISULPHIDE CARBON**, Lefort. xix, 145.
- **FLAVORING**, see respective names under **EXTRACTS**.
- **FLUID**, see **FLUID EXTRACTS**.
- **WITHOUT HEAT** (by freezing), Herrera. xxvi, 95.
- **GREEN**, Ph. Brit. (from all the soft parts), Naylor. xxix, 68; much less active than fr. dried by alc. or water, Bretet. xxviii, 50; xxx, 75.
- **LIQUID**, see **FLUID EXTRACTS**.

- Extracts, NARCOTIC**, chlorophyll questionable, Barnes. xxi, 165; Heathfield. xxiii, 56—comparat. value, Bretet. xxviii, 50; xxx, 75.
- **PERFUME**, see respect. names under **EXTRACT**.
- **POWDERED**, drug itself as standard, not the solid extract. Hallberg. xxix, 424; Remington. xxix, 524—Stromeyer (with cane sugar). xxi, 166—keep dry, surrounded by exsiccated sulph. soda, Kirchmann. xxix, 69.
- of **FRENCH** pharmacopœia (1880) criticised, Champigny. xxx, 75.
- of **GERMAN** pharmacopœia (1872) reviewed, Enders. xxv, 71.
- **SACCHARATED**, Hallberg. xxvii, 715.
- **SULFO-CARBONIC**, Lefort. xix, 145.
- **TEST** for copper and tin (=zinc), Hager. xxi, 165.
- Extract, ABSYNTH**, contains chloride pot., Claassen. xxx, 81—use boiling water, Enders. xxv, 71—yield. xxiii, 56.
- **ACONITE** alcoholic, yield, and cost, Saunders. xix, 469—Ph. Brit. (neither chlorophyll nor starch ought to be removed), Heathfield. xxiii, 56—with boiling alc., Enders. xxv, 71—experiments with powdered, Hallberg. xxix, 427.
- **ALOE** (cold water better than hot), Kennedy. xxv, 402—(hot water), Enders. xxv, 71—yield, Schwabe. xix, 145; xxi, 131.
- **ANTIDYSENTERIC**, **AQUEOUS** (fr. fruit of *Garcinia mangostan*), Gruppe. xxv, 373.
- **ARNICA** alc., yield and cost, Saunders. xix, 470.
- **BEEP**, see **EXTR. MEAT**.
- **BELLADONNA**, home-made, Saunders. xviii, 184; xix, 470—comparat. value of var. processes, Bretet. xxviii, 50—American cont. more atropin than English, Webber. xxiv, 71—root better than leaves, Enders. xxv, 72—neither starch nor chlorophyll ought to be removed, Heathfield. xxiii, 56—from all the soft parts, Naylor. xxix, 68—yield and cost, Saunders. xix, 470; xxiii, 55—experiments with powdered, Hallberg. xxix, 425, 7.
- **BOLDO**, Verne. xxiii, 61.
- **BUTTERNUT**, dilut. alc. best, Morse, Jr. xxix, 71—80 years ago, xxvi, 849.
- **CALABAR BEANS**, cheap. xix, 60, 348—excessive dose in Bartholow, Hoglan; Maisch. xxix, 71—prep., Kennedy. xxiii, 603—yield. xxiii, 56—experiments with powdered, Hallberg. xxix, 427.
- **CALAMUS**, yield. xxiii, 56.
- **CANNABIS INDICA**, value determin. by solvents, Duprez. xxvii, 77—yield. xxiii, 56; Saunders. xx, 220—experiments with powdered, Hallberg. xxix, 427.
- **CARDUI BENEDICTI**, yield. xxi, 131.
- **CASCARILLA**, yield. xxi, 131.
- **CATECHU**, yield. xxi, 131.
- **CELERY**, flavoring, Fairthorne. xxx, 124.
- **CENTAUREI MINOR.**, yield. xxi, 131; xxiii, 55.
- **CHAMOMILLÆ** (matricar.), yield. xxiii, 55.
- **CHRLIDONII**, yield. xxiii, 56.
- **CHINE FRIGIDE PARAT.** (glycerin), Bauer; Kauffman. xxiii, 57—(E. India calisaya better), Schneider. xxix, 71—yield. xxiii, 55.
- **CHINÆ FUSC.** (should be dry), Schneider. xxiii, 58.
- **CINCHONA**, Champigny (with water, and add crude alk. fr. residue). xxx, 76—Vrij (water and calculated mur. ac.). xxviii, 56—Saunders (yield and cost). xix, 471—yield. xxi, 131; xxiii, 56.
- **"CLOVE PINK,"** perfume, Saunders. xxiv, 504.
- **COCA**. xxv, 76—Shuttleworth. xxiii, 61, 62.
- **COLCHICI**, Heathfield. xxiii, 56—yield of acetic. xxi, 131.
- **COLOCYNTH** (cold water as good as dil. ac.), Barnes. xxii, 69—home-made, yield. xxi, 131; Klie. xxvi, 128, 9; Maisch. xxvi, 130; Squibb. xxvi, 130.
- **COLOCYNTH. COMP.**, estimat., Oleson. xxv, 73—ingredients should be "melted" together. Markoe. xxi, 516—home-made, Klie. xxvi, 129.
- **COLUMBO**, yield. xxi, 131; xxiii, 55.
- **CONIUM** leaves (neither chlorophyll nor starch ought to be removed), Heathfield. xxiii, 56—
- Extract. (Continued.)**
- yield. xxi, 131; xxiii, 55—and cost, Saunders. xix, 472; experiments with powdered, Hallberg. xxix, 427.
- **CUBEBS**, yield. xxiii, 56.
- **"CUIR DE RUSSIE,"** perfume, Dubelle. xxvii, 125.
- **CYNÆ**, yield. xxiii, 56.
- **DANDELION**, see **EXTR. TARAXACUM**.
- **DIGITALIS**, yield. xxiii, 55—and cost, Saunders. xix, 472; experiment with powdered, Hallberg. xxix, 427.
- **DROSERÆ**. xxvii, 226.
- **DULCAMARA**, yield. xxi, 131—and cost, Saunders. xix, 473.
- **"EDEN, SWEET GEM"** perfume, Dubelle. xxvii, 125.
- **ELCAMPANÆ**, see **EXTR. INULA**.
- **ERGOT**, Squibb. xxi, 644; xxiv, 465—yield. xxi, 131; xxiii, 56.
- **ERGOT**. Ph. German (evap. to definite weight and dissolve in alc.), Saltzer. xxx, 80; Diehl. xxix, 69, 70; xxx, 81, note.
- **"ESS. BOUQUET"** perfume, Saunders. xxiv, 501.
- **EUCALYPTUS** (oil added to the finished extr.). xxi, 166.
- **"FAIRMOUNT PARK"** perfume, Dubelle. xxvii, 125.
- **FERRI ROMATUM** (rationale). xix, 145—substit. by using grape juice (= "uvicum"), Landerer. xxvi, 97—yield. xxi, 131.
- **FERRI UVICUM**, Landerer. xxvi, 97.
- **"FRANGIPANNI"** perfume, Saunders. xxiv, 504.
- **FRAXINUS AMERICANUS**, Edwards. xxx, 81.
- **FUCUS VESICULOSUS**. xxv, 117—Shuttleworth. xxviii, 52.
- **GENTIANA**, yield. xxi, 131.
- **GLYCYRRHIZÆ**, see **LICORICE**.
- **GLYCYRRHIZÆ** for dispensing, Shryock. xxiv, 83—Appenzeller. xxvi, 96—yield fr. root. xxi, 131; xxiii, 55; xxvii, 246.
- **GRAMINIS**, hints, Dannenberg. xxv, 72—yield. xxiii, 55.
- **GUARANA**, Moore. xxiii, 60.
- **HÆMATOXYLI**, Schneider. xxiii, 59—Jamaica. xxiv, 736—pill excip. (manna), Fairthorne. xxx, 101—yield. xxi, 131; xxiii, 55.
- **HELLEBORI**, yield and cost, Saunders. xix, 473—xxi, 131.
- **HEMLOCK** bark. xviii, 136.
- **HINAU** (= *Elaeocarpus dentatus*), New Zealand. xxv, 366.
- **HYOSCYAMUS**, cont. chlorid. pot., Huguet. xxv, 76—(neither starch nor chlorophyll ought to be removed), Heathfield. xxiii, 56—home-made, Saunders. xviii, 185; xix, 474—experiment with powdered, Hallberg. xxix, 427—yield and cost, Saunders. xix, 474—yield in Canada, Shuttleworth. xxi, 214—Heintz. xxiv, 72—xxi, 131; xxiii, 55.
- **IGNATIA**, yield and cost, Saunders. xix, 474—experiment with powdered, Hallberg. xxix, 427.
- **INULA**, yield. xxi, 131; xxiii, 56.
- **JALAPA**, examin. of commercial, Farwell. xxvii, 77—aqueous worthless, Maisch. xix, 116; Markoe. xxi, 516; Proctor, Jr. xix, 116—makes each separately (aq. and alc.) and mixes, Squibb. xix, 465—(exhausts whole with water, powd. and with alc.), Klie. xxiv, 72—yield and cost, Saunders. xix, 475; Squibb. xix, 466—experiment with powd., Hallberg. xxix, 427.
- **"JOCKEY CLUB"** perfume, Saunders. xxiv, 500.
- **JUGLANDIS CORT**, see **EXTR. BUTTERNUT**.
- **JUNIPER BERRIES**, exam. of commercial, Schilbach. xxviii, 52.
- **KRAMERIA**, examin. of commercial, Hoppa. xxviii, 50—contamin. with copper, Janota. xxi, 166—cont. rhatanin, Ruge. xxiii, 60—contains tyrosin, Wittstein. xxiii, 60—prep., Hoppa. xxviii, 50—variability of commercial extracts due to source of root, Burg. xxx, 79—fr. Peruvian rhatany differs fr. Brazilian, Kreitmair. xxiii, 60—yield. xxi, 131.

Extract LEMON on a large scale. xxvii, 106.

— LICORICE, see LICORICE and EXTRACT, GLYCYRRHIZÆ.

— LOGWOOD, see EXTR. HÆMATOXYLI.

— MALT, examin. of commercial samples, Dunstan and Dimmock. xxvii, 78—estimat., Cowdrey. xxx, 548; Hager. xxiv, 73; xxx, 79; Prescott. xxx, 637—discussion. xxx, 637, 640—avoid high heat, Cowdrey. xxx, 548—prep., Ebert. xix, 146; Goodale. xxx, 78; Jassoy. 167; Mattison. xxv, 75; Phar. Soc. Paris (113° F.). xxvi, 96; Rohrer. xxii, 69; revision U. S. Ph. xxvii, 675—objects to Liebig's name, Maisch. xix, 59.

— MALTI CHINIATUM, Hager. xxiv, 74.

— MALT and CODLIVER OIL, Mattison. xxv, 76.

— MALTI FERNATUM, Hager. xxiv, 74; Mattison. xxv, 75.

— MALTI IODATUM, Hager. xxiv, 74.

— MALTI PEPSINATUM, Hager. xxiv, 74.

— MALTI TANNO-CHINIATUM, Hager. xxiv, 74.

— MATÉ, Robbins. xxvi, 305.

— MEAT, analysis, Brady. xix, 80; Chandler and Cairns. xxii, 70; Ebert. xix, 512; Tscheppe. xxviii, 52—most important test is p. c. of nitrogenous matter, Chandler and Cairns. xxii, 7—discussion. xix, 79—contamin. with red lead, Williams. xxii, 319.

— MEAT, LIEBIG'S first (recommend to filter it). xix, 146—evaporat. juice, Paul. xix, 146.

— MEAT, AUSTRALIAN (Ramorine). xix, 513.

— MEAT, MONTIVIDEO, Reichardt. xix, 146.

— "MIGNONETTE" perfume, Saunders. xxiv, 505.

— "MILLEFLEURS," perfume, Cotzhausen. xxv, 322—Saunders. xxiv, 502.

— MILLEFOLI, yield. xxiii, 55.

— MONESIA, adult. (extr. logwood) xxi, 479.

— "MOSS ROSE," perfume, Saunders. xxiv, 500.

— "MUSK" perfume, Cotzhausen. xxv, 322—Saunders. xxiv, 499, 501.

— MYRRH, yield. xxi, 131; xxiii, 55.

— NUX VOMICA, Wolff. xxv, 72—examin. of fixed oil, Bullock. xxiii, 6—yield is according to menstruum, Hallberg. xxix, 425—yield and cost, Saunders. xix, 475—experiments with powdered. Hallberg. xxix, 425, 7.

— "NEW MOWN HAY" perfume, Miller. xxiii, 117—Saunders. xxiv, 504.

— OPII, hypodermic solut., Powers. xxvii, 93—experiments with powdered, Hallberg. xxix, 425, 7—prep., Lemberger (benzin). xxvi, 898—relative quantity of water not unimportant, Périer. xxii, 142—French codex 1880. xxx, 75—distilled water best, Menière. xxii, 92—yield. xix, 145; xxi, 131—Ph. Brit. real strength, Shuttleworth. xxiv, 181.

— ORANGE PEEL, yield. xxiii, 55.

— "ORRIS" perfume, Saunders. xxiv, 499.

— "PATCHOULY" perfume, Saunders. xxiv, 500.

— "PEARL OF SAVOY" perfume, Dubelle. xxvii, 125.

— PHYSOSTIGMA, see EXTR. CALABAR BEANS.

— "PICUS PORTEANA" (11 grs. morph. in fl. oz.), Wayne. xxii, 321.

— PIMPINELLA, yield. xxi, 131.

— "PINK DOMINO" perfume, Dubelle. xxvii, 125.

— PODOPHYLLI, yield and cost, Saunders. xix, 476—experiments with powdered, Hallberg. xxix, 427.

— PULSATILLA, yield. xxiii, 55.

— QUASSIA, relative quantity of alc. and aqueous extract, Whall. xxii, 379—dil. alc. best menstruum, Whall. xxiii, 62—yield. xxi, 131, xxiii, 56.

— QUILLAYA, dry (= quillayin), McDonnell. xxx, 81.

— RHEI, yield and cost, Saunders. xix, 477—xxi, 131; xxiii, 56—experiments with powdered, Hallberg. xxix, 427.

— "RONDELETIA" perfume, Saunders. xxiv, 503.

— SAMBUCCI, yield. xxi, 131.

— SANTONICA, see EXTR. CYNÆ.

— SAVIN, yield. xxiii, 56.

— SECALE CORNUTI, see EXTR. ERGOT.

— SENEGA, yield and cost, Saunders. xix, 477—xxi, 131; xxiii, 56; xxiv, 73.

— SOUP HERBS, flavoring, Fairthorne. xxx, 124.

Extract "SPRINGFLOWERS," perfume, Saunders. xxiv, 502.

— SQUILLS, yield. xxi, 131; xxiii, 56.

— "STEPHANOTIS" perfume, Saunders. xxiv, 503.

— "STOLEN KISSES," perfume, Dubelle. xxvii, 125.

— STRAMONI, yield and cost, Saunders. xix, 478—xxiii, 56—experiments with powdered, Hallberg. xxix, 427.

— "STYRAX" perfume, Saunders. xxiv, 499.

— of TAMARINDS, Erba. xxvii, 69.

— TAR (aqueous), Ciutlini. xxviii, 52.

— TARAXACUM, adult. (extr. licorice). xxi, 480—yield. xxiii, 56.

— "TONKA," perfume, Saunders. xxiv, 499.

— TOWAI (= Weinmannia racemosa), New Zealand. xxv, 365.

— "TUBERCSE," perfume, Saunders. xxiv, 502.

— VALERIANA, yield and cost, Saunders. xix, 478—xxiii, 56—experiments with powdered, Hallberg. xxix, 427.

— VANILLA, flavoring, adult., Miller. xxiii, 517—prep., Becker (sugar, dil. alc.). xxv, 113; Bond (brittle by previous macerat. in alc.). xxiii, 102; Fairthorne (sugar). xxx, 124; Kennedy (sugar). xxx, 123; Nichols (macerate with half menstr., and digest with other half). xxi, 597; Moore (digestion). xxi, 131.

— "VANILLA" perfume, Saunders. xxiv, 499.

— "VICTORIA," perfume, Saunders. xxiv, 501.

— "VIOLET" perfume, Saunders. xxiv, 505—

with oil of orris. xxiii, 334.

— "WEST END," perfume, Saunders. xxiv, 503.

— "WHITE ROSE," perfume, Saunders. xxiv, 500.

— "WOOD VIOLET" perfume, Saunders. xxiv, 502.

— WORM WOOD, see EXTR. ABSYNTH.

— YARROW, see EXTR. MILLEFOLI.

— "YLANG-YLANG," perfume, Saunders. xxiv, 502.

Eyewash, see COLLYRIUM.

Eysenhartia AMORPHOIDES, Mexico. xxiv, 776.

F.

Fabiana IMERICATA, Chili. xxiv, 766.

Fabrics, TEXTILE, incombustible, Patera. xix, 171.

Face powder and PAINTS, Langwisch. xxv, 367—Danish. xxiii, 117.

Fagus MENZIESII, New Zealand. xxiv, 738.

— SYLVATICA, analysis of ash of leafbud scales, Church. xxv, 230.

— see BIRCH.

Faham tea = Angraecum fragrans, France. xxix, 131.

Fairchild, B. T., therapeutic knowledge of pharmacists. xxv, 396.

Fakuliyun (Arabic-Greek) = Lawsonia alba. xxvii, 238.

Fan-ke-so = Pinellia tuberifera, Japan. xxviii, 102.

Farfara, loss in drying. xxi, 202.

Farfizun (Persian) = Euphorbium. xxviii, 193.

Fa-ri-ju-ri = Fritillaria Thunbergii, Japan. xxviii, 110.

Fascomylea = excrescences of Salvia pomifera, Greece. xxiv, 134.

Fasogh = Ferula orientalis, Morocco. xxiv, 114.

Fats, determin. of free acids, Barstyn; Hoffmann; Strohmman. xxx, 364—decomp. by sulph. ac. without distillat., Bock. xxiv, 302—decomp. products by superheated steam, Cahours and Demarçay. xxiv, 303—extracting apparatus, Tollens. xxvii, 420—melting point, apparatus, Guichard. xxviii, 288; Hager. xxviii, 228—detect. of mineral oils, Geissler. xxviii, 288; Thompson. xxvii, 425—saponificat. by sulph. ac., history, Frémy. xxvii, 426—separat. fr. soap, Wolff. xxviii, 289—spec. grav., Hager. xxvii, 28, 422; apparatus, Königs. xxvii, 421.

— HERON'S, Greece. xxvi, 502.

Faturasalum (Arabic-Greek) = Prangos papularia, India. xxvi, 158.

Faucets, WOODEN, cracks prevented (paraffin). xix, 175.

Feemster, J. H., Guarana. xxx, 569.

Fees, ANNUAL (change fr. \$3 to \$5), discussion. xviii, 44.

- Fehling's test** changed by distilled water, Boivin and Loiseau. xxiii, 238, 364—change due to oxidat. of tartaric ac., Löw. xxvii, 356—source of error in solubility of filt. pap. in alkal. copper sol., Brunner. xxi, 354—stable (neutral tartr. copper), Hager. xxiii, 365; Lagrange. xxiv, 316; by replacing tart. ac. by glycerin, Löwe. xix, 258; with salicyl. soda, Schreiter. xxix, 79—kept ready in two solutions, Rodewald and Tollens. xxvii, 447.
- Fehr, Julius**, complaints. xxiii, 842; xxiv, 619.
- discussions. xxii, 535, 559, 566; xxiii, 834, 842, 843; xxiv, 622.
- Feigel** = *Ruta graveolens*, Malta. xxvi, 167.
- Feiso** = *Nuphar japonica*, Japan. xxviii, 115.
- Feldspar**, solub. in water, Cossa. xix, 196.
- Felons**, pokeroor poultice, Hooper. xxv, 61.
- Feminelle** = *Calendula* dyed with logwood. xxiii, 510.
- Fennel**, adult. (extracted seed) xxviii, 159—for sore eyes, Greece. xxv, 170—in fine powder (by keeping for months coarsely ground), Kalbrunner. xix, 276.
- **INDIAN** = *Foeniculum panmorum*. xxiv, 721.
- Fenugreek**, adult. xxi, 502—cultivat. in Canada, Saunders. xxiii, 186.
- Ferguson, R. B.** Suppositories.
- Ferments, DIGESTIVE**, Roberts. xxviii, 360.
- Fermented LIQUIDS**, alkaloid in residue, Oser, xviii, 267.
- Fermentation, ACETIC**, causes, Blondeau. xxvii, 451—prevented by boric ac. and rosin, Herzin. xxviii, 304.
- **ALCOHOLIC**, act. of alkaline salts, Knapp. xxi, 401—physiology and morphology, Hansen. xxx, 454—theory (Liebig vs. Pasteur). xviii, 245; Miguel (supports Pasteur). xxvii, 539; Bernard (conflict. with Pasteur). xxvii, 537; (refuted by Pasteur. xxvii, 538)—under reduced pressure, Brown. xxi, 401—hastened in vacuum, Boussingault. xxix, 369—retarded by quinia, Binz. xxi, 401.
- **LACTIC**, microscop. descript., Boutroux. xxvii, 46—act. of oxygen and of boiling, Richet. xxviii, 307—increased by gastric juice, Richet. xxvi, 529.
- Fern, MALE**, comparative assay, Kruse. xxv, 121.
- **RATTLESNAKE** = *Botrychium lunarioides*, Kansas. xxix, 445.
- Ferns, MEXICO**. xxiv, 769.
- Feronia ELEPHANTUM**, India. xxiv, 718—examin. of gum, Masing. xxix, 213.
- Ferric**—see **IRON (SESQUI- or FER-)**.
- Ferricyanides**, metallic, oxidizing power, Bong. xxvi, 369.
- Ferrocyanides**, constitution, Schnacke. xxi, 286—peculiarity of metallic, Guyard. xxvii, 321.
- Ferromanganese**, Jordan. xxvii, 347.
- Ferrous**—see **IRON (PROTO-)**.
- Ferrum**, see also **IRON**.
- **AMMON. CITR., -SULPH., -TARTR.**, see **IRON**.
- **ARSENIDE; BENZOATE; BROMIDE; CARBON.**, see **IRON**.
- **CARBONICUM SACCHARATUM**, history, Dujardin-Beaumetz. xxx, 105—in estimat. ferrous carbon. use phosph. ac. for mur. ac., Howie. xxiv, 245—in crystals, Tanret. xxix, 309.
- **CATALYTICUM**, Wagner. xxv, 33, 87—constitution, Scheffer. xxvi, 114, 5; Hager. xxv, 87; Oltmann, xxvi, 113.
- **CHLORID. (per- and proto-); CHROMATE; CITRATE; DIALYZED; by HYDROGEN; HYPOPHOSPH.; IODIDE; LACTATE; NITRATE; OLEATE; OXALATE; see IRON.**
- **OXYDATUM SACCHARATUM**, Duquesnel. xxi, 178—estimat., Schacht. xxi, 178.
- **OXYDATUM SACCHARATUM SOLUBILE**, a better antidote than hydrat. sesquioxide, Köhler. xviii, 235—prep., Brunnengraber. xxx, 104; Förster. xxx, 103.
- **PEROXIDATUM-CHLORIDATUM**, Hager. xxv, 33.
- **PHOSPHATE; POTASS. TARTR., PYROPHOSPH., QUINIA CITR.**, see **IRON**.
- **REDACTUM**, see **IRON BY HYDROGEN**.
- **SALICYL., SODA; STRYCHN.; SUBCARBON.; SULPHATE; SULPHIDE, etc.**, see **IRON**.
- Fertilizer, PLANT**, Hogan. xxv, 115.
- Ferula**, etymology. xxiii, 359.
- **ALLIACEA**, India, descript., Dymock. xxvi, 160.
- **GALBANIFLUA**, India, descript., Dymock. xxvii, 193.
- **ORIENTALIS**, Morocco. xxiv, 114.
- **RUBRICAULIS**, Persia, account, Dymock. xxvii, 193.
- Feshook**=*Ferula orientalis*, Morocco. xxiv, 114.
- Festuca ELATIOR**;—*F. PRATENSIS*, ergot, Wilson. xxiv, 120.
- **SCABRELLA**, California. xxvii, 605.
- Feuillea CORDIFOLIA**, Jamaica. xxiv, 732.
- Fever BUSH**. See *Benzoin odoriferum*.
- **PLANT**=*Ocimum viride*, Liberia. xxvi, 168.
- **ROOT**=*Triosteum vulgare*, Kansas. xxix, 441.
- **TREE**=*Eucalyptus globulus*. xxi, 250.
- **WOOD**. See *Benzoin odoriferum*.
- Fibrin transformed into albumen**, Gautier. xxiii, 465—yields a trace of albumen with bichrom. mixt., Stædeler. xxvii, 398—act. upon pepsin, Willich. xxi, 404.
- Fichte, BALSAM-**,= *Abies balsamea*. xxvi, 315;—**GEMEINE F.**= *Pinus sylvestris*. xxvi, 317;—*Abies excelsa*. xxvi, 323;—**LARCHEN F.**= *Larix europæa*. xxvi, 321.
- Ficoideae**, California. xix, 300.
- Ficus GUMMIFLUA**, Java, examin. of wax, Kessel. xxvii, 268.
- **NYMPHÆFOLIA**, Mexico. xxiv, 768.
- Fidlokkum**=*Borrago* off., Malta. xxvi, 167.
- Fig**, digestive ferment. of juice, Buchut. xxix, 368.
- **OF THE CHRISTIANS**=*Cactus opuntia*. xxi, 145.
- Figue DE BARBARIE**=*Cactus opuntia*. xxii, 145.
- Filices**. xxii, 98; xxiv, 121; xxv, 121; xxvi, 178; xxvii, 136; xxx, 146—of California. xix, 307; Kansas. xxix, 445.
- Filicium (Thwaites)**, India. xxiv, 196.
- Filix**, see **FERN**.
- Filtration, RAPID**: Bulk (suct. and pressure). xxv, 41—Cochrane (Bunsen; cone of parchment paper). xxiv, 54—Cohn (for quantitat. work). xxx, 39—Ebermayer (muslin and pap. filt.). xxvii, 46—Endliger (frames of sheets of filt. pap.). xxix, 41—Fischer (water pressure). xxv, 40—Hildebrand (filt. tube and Scheibler's aspirator). xxv, 38—Hindley (plunger piston). xxvi, 61—Hinrichs (Bunsen). xviii, 206—Holt-hof (suction bottle). xxvi, 62—Lux (aspirator). xxix, 43—Mattison (lamp-chimney and atomizer bulb). xxvi, 63—Mollin (perforated funnel and vacuum). xxix, 41—Parsons (Bunsen, platin. cone). xxvii, 49—Partridge (rubber bulb and Bunsen's valve). xxix, 39—Stevens (Bunsen modif.). xxiv, 55—(paper pulp on felt or flannel). xix, 135, 136—(suction box). xxx, 37—see also **ASPIRATORS**.
- **APPARATUS**, Holzinger (box with sides of filt. pap.). xxvii, 45—Gilbert (metal cone for weighing filters). xxx, 27—Seaman (automatic balance). xxiv, 56—Haagen (prevent. of channels through sand and charcoal). xxviii, 28.
- **CONTINUOUS**: Gawalowski (siphon). xxiii, 37—Casamajor and Senff (filt. cloth on cylinder with suct. pump). xxx, 38—Yvon (siphon regulator). xxvi, 65.
- **separat. of CRYSTALS fr. extractive matter**, Missaghi. xxiv, 57.
- **DROP or minim**, for eye lotions, etc. xxv, 42.
- **DRIED** (spread on infusorial earth), Austen. xxvii, 50.
- **at CONSTANT TEMPERATURE** (coils of lead pipe through which pass vapors), Horworth. xxii, 49.
- **SUGARHOUSE filter** (Taylor). xxvi, 64.
- **TURBID liquids kept fr. contact with air**, (linen bag in the liquid). xxvii, 44.
- **VISCID liquids** (tube in hot water) Elsdon. xxix, 42.
- Filter**, muslin stretched over a frame, fitting in a funnel. xxvii, 47.
- **asbestos**, Trobach. xxx, 40—glass-felt, Weiskopf. xxi, 152—asbestos and glass wool, Bovet. xxxviii, 295—"iron cuts," Rother. xxi, 152.
- Filtering PAPER**, Hirsh. xviii, 143; xix, 139—contain. free acid, Heintz. xxx, 40; 3 grains iron per

Filtering PAPER (*Continued*).

sheet, Starting, xxiv, 58—comparison, Greenish. xxv, 43—decomposed by solut. of salts and by dist. water. xxviii, 295—purif. (by mur. ac.) xxiv, 683—Swedish. has lost its prestige, Mohr. xxii, 49; cont. phosph. ac., Uelsmann. xxv, 44—discussion. xxiv, 683.

Filter PRESS (bag to be twisted), Gigot. xxix, 37

— **PUMP** (modif. of Sprengel), Buck. xxiv, 54; xxvi, 60.

— **SIPHON**, Gregory. xxiv, 27, 56.

— **STAND**, Remington. xxvi, 52—see also **PERCOLATOR**, **STAND**—bent iron rod. xxvi, 66.

Financial STATUS, Maisch. xxvii, 775.

Fique, Arg. Republ. xxiv, 762.

Fir, resin fr. cones in Greece. xxix, 236.

—, **BALM OF GILEAD** = *Abies balsamea*. xxvi, 314.

—, **BALSAM**—, see **ABIES BALSAMEA**.

—, **LOFTY OR NORWAY SPRUCE** = *Abies excelsa*. xxvi, 323.

—, **MARITIME** = *Pinus maritima*. xxvi, 316.

—, **PECTINATE** = *Abies pectinata*. xxvi, 313.

—, **PRUSSIAN** = *Abies excelsa*. xxvi, 323.

—, **RED**, = *Abies Douglassii*, California. xxvii, 601.

—, **SCOTCH**, = *Pinus sylvestris*. xxvi, 317.

—, **SILVER**, = *Abies pectinata*. xxvii, 313.

—, **SILVER, AMERICAN** = *Abies balsamea*. xxvi, 314.

—, **SILVER, CALIFORNIA** = *Picea bracteata*. xxvii, 601.

—, **SPANISH**, = *Abies pectinata*. xxvi, 313.

—, **WHITE**, = *Picea grandis*, California. xxvii, 601.

Fire, COLORED (green, red, violet), Kern. xxv, 115.

— **COLORED**, safe, Böttger (with shellac). xxii, 56; Sailer. xxx, 137.

Fireproofing fabrics, etc. xxviii, 98.

Fish, Chas. F. Address of welcome. xxviii, 496.

Fish preserved by perchloride iron, Almés. xxiv, 244.

Fistulina HEPATICA, cont. oxalic ac., Hamlet and Plowright. xxvi, 178.

Fiturasaliyun (Arabic-Greek) = *Prangos pabularia*, India. xxvii, 192.

Fki Jamogi = *Artemisia capillaris*, Japan. xxviii, 145.

Flagg's RELIEF, Pierson. xxiv, 421.

Flannel, bleach, Artus. xix, 168.

Flavenia DAUDA, Chili. xxiv, 766.

Flavescin (alkalimetric indicator), fr. oak, Lux. xxix, 356.

Flaxseed, chem. formula of mucilage, Kirchner and Tollens. xxiv, 315—whole seed attacked by *Pyralis farinalis*, Saunders. xxi, 628—analysis of ash, Landreau. xxx, 216—as deodorant, Huber. xxv, 194—yield of oil, Kaspar. xxix, 194.

— **VARIETIES** and adulterants in English commerce, Holmes. xxx, 214.

—, **BALTIC**; — **BOMBAY**; — **BLACK SEA**; — **CALCUTTA**; — **CATANIAN**; — **DUTCH**; — **ENGLISH**; — **DORIAN**; — **LITHUANIAN**; — **RUSSIAN**; — **TURKISH**; foreign seeds admixed, Holmes. xxx, 214, 5, 6.

Fleabane, CALIFORNIA = *Coryza salicifolia*. xxvii, 609.

Fleaseed, see **PSYLLIUM**.

Fleawort, see **PSYLLIUM**. xxx, 161.

Flor DE CORPUS, Arg. Republ. xxiv, 763.

— **DE LA NOCHE**, Arg. Republ. xxiv, 763.

— **DE LA NOCHE BUENA** = *Euphorbia pulcherrima*, Mexico. xxiv, 771.

Flores SELIGINIS = anthers of *Triticum hibernum*, uses, Reiche. xxix, 121.

Florida water, perfume, Dubelle. xxvii, 125.

Flour, mineral adult. detect. (chlorof.), Siebold. xxviii, 278—impurities detect. (acidul. alc.), Vogel. xxx, 147—estimat. gluten, Bénard and Girardin. xxx, 452—deteriorates by long keeping in casks, Poleck. xix, 238—damp fl. always cont. glucose, Pöchl. xxx, 127.

Flowers, coloring matter only modif. of chlorophyll, Schnetzler. xxix, 353—when to gather, Diehl. xviii, 140—amount of sugar in nectar, Wilson. xxvii, 442.

Flower of an hour = *Hibiscus trionum*, Kansas. xxix, 448.

Fluggia JAPONICA, Japan. xxxiii, 204.

Fluid beef, JOHNSTON'S, analysis, Tscheppé. xxviii, 53.

Fluid extracts, estimat. of alkaloids (iodohydr. pot.), Schrank. xxiv, 75; (iod. bism. and pot.) Thresh. xxviii, 319, 320—American superior to English, Umney. xxi, 168—in Canada. xxv, 341—analysis of commercial, Remington. xix, 348; Schrank. xxiv, 409; Smith. xxv, 78—alcoholic strength of commercial, Conrath. xxx, 545—comparisons of four diff. methods (without, with and interrupted maceration), Robbins. xxvii, 79—method of control, Diehl. xxvi, 691—co-operative experiments, Diehl. xxvi, 104, 681, 686, 694-7; xxviii, 424—estimation, Diehl. xxvi, 689—discussion. xviii, 102; xxviii, 550; xxx, 657—drop equivalent, Talbot. xxix, 34—philosophy of experimentation, Diehl. xxvi, 682—exhaust. not possible (80 p. c. at the utmost), Squibb. xix, 136—extraction, Diehl. xxvi, 686—estimat. of extracted matter, Diehl. xxvi, 688—glycerin not always beneficial, Gill. xxi, 168; Lehmann. xxvi, 105; Lloyd. xxv, 408; Markoe. xxi, 517—heat not so injurious, Diehl. xix, 115; xxvi, 684—non-alcoholic, by insuccation, Biroth. xxv, 76—act. of light, Lloyd. xxix, 412—measure for weight, Diehl. xxviii, 552; Squibb. xix, 456, 7; Taylor. xviii, 103—objections to two menstrua, Diehl. xxvi, 684—a slight change in menstr. makes a decided diff. in appear., Lloyd. xxiv, 521—menstrua, Squibb. xviii, 58, 102, 161; xix, 136—obtainable aim, Lloyd. xxix, 421—percolation (simple), Diehl. xxvi, 686, 693; fractional, Diehl. xxvi, 687—percolat. alone gives no permanent fld. extr., Lloyd. xxix, 421—reserved percolate idea will pass away, Lloyd. xxix, 410, note—precipitate, Lloyd. xxix, 408; xxx, 509—why precipitation occurs, Lloyd. xxix, 416—why continue to form, Lloyd. xxix, 417—discussion. xxx, 657.

— **PROCESSES**: object. to Procter, Squibb. xxvi, 709—Allaire (alc. to second percol. before mix.). xxiii, 62—Campbell (macerat., glyc.). xviii, 207—Diehl (evapor. port. up to origin. alc. strength). xxvi, 105; xxvii, 727; (half strength (50 p. c.) recommended). xxvii, 727; (coöperat. plan). xxviii, 424—Lloyd (packing at least 15" high). xxv, 409; (no previous macerat. best). xxvi, 106—Sargent (50 p. c.). xviii, 207—Squibb (repercolation). xviii, 102; xix, 136; xxvi, 97, 708, 710, 725, 734, 753.

— spec. grav., Klie. xxv, 77—act. of temperature, Lloyd. xxix, 411—object. to U. S. formulas, Diehl. xxvi, 683; deduct. fr. U. S. formulas, Squibb. xxvi, 725—how to make by weight, Squibb. xix, 461. See also **PERCOLATION**.

Fluid extract ACONITE LEAVES, coöperat. plan, Diehl. xxvi, 694, 5, 6 (No. 16).

— **ACONITE ROOT**, Diehl: coöperat. plan. xxvi, 694, 5, 6 (No. 8, 32); menstruum, vol. and weight equiv. xxviii, 427; per. cent. of dry extr. xxviii, 430—Squibb: best menstruum. xxviii, 550; repercolat. xxvi, 753.

— **ARNICA ROOT**, Diehl: menstruum, vol. and weight equiv. xxviii, 428; per cent. of dry extr. xxviii, 430—Squibb, repercolat. xxvi, 753.

— **AROMATIC POWDER**, Squibb, repercol. xxvi, 753.

—, **ASARUM CANAD.**, Gorder. xxiv, 76—Diehl, menstruum, vol. and weight equiv. xxviii, 428; per cent. of dry extr. xxviii, 430—Squibb, repercol. xxvi, 753.

— **ASCLEPIAS TUBEROSA**, repercol., Squibb. xxvi, 754.

— **ASPIDOSPERMA**, see **FLUID EXTR. QUEBRACHO**.

— **AURANT, CORT.**, Bond. xxii, 71—Diehl, menstruum, vol. and weight equiv. xxviii, 428; per cent. dry extr. xxviii, 430.

— **AZEDARACH**, Miles. xxiii, 63.

— **BEEF**, Parrish (beefstock and glyc.). xix, 147.

— **BELLADONNA, LEAVES**, estimat. of alkaloid, Schrank. xxiv, 75—alcohol. strength of commerc., Conrath. xxx, 546—Diehl, menstruum, vol. and weight equiv. xxviii, 428; per cent. dry extr. xxviii, 430—Squibb, repercol. xxvi, 753.

— **BELLADONNA ROOT**, Lloyd (strong alc.). xxv,

Fluid extract (Continued)

- 410—Diehl, coöperat. plan. xxvi, 694, 5, 6 (No. 12); menstruum, vol. and weight equival. xxviii, 428; per cent. dry extr. xxviii, 430—Squibb. xviii, 174; repercol. xxvi, 753.
- BETONY, Vogeler. xxx, 82.
- BLACKBERRY, see FLUID EXTR. RUEUS VILLO-SUS.
- BLACK HAW, see FLUID EXTR. VIBURNUM PRU-NIFOLIUM.
- BUCHU, alcohol. strength of commerc., Con-rath. xxx, 546—coöperat. plan, Mohr. xxvi, 696, table—spoiled by glycerin, Gill. xxi, 168—Diehl: menstruum, vol. and weight equival. xxviii, 428; per cent. of dry extr. xxviii, 430—Squibb: best menstruum. xxviii, 550; xviii, 175; repercol. xxvi, 753.
- BUCKTHORN BARK, see FLUID EXTR. FRANGULA.
- BUTTERNUT BARK, see FLUID EXTR. JUGLANS.
- CALABAR BEANS, Kennedy. xxiii, 653.
- CALAMUS, Diehl, menstruum, vol. and weight equival. xxviii, 428; percent. dry extr. xxviii, 430.
- CALISAYA, see FLUID EXTR. CINCHONA.
- CANADA SNAKE-ROOT, see FLUID EXTR. ASARUM.
- CANNABIS INDICA examin. of commerc., Buch-man. xxii, 73—Diehl: menstruum, vol. and weight equival. xxviii, 427; per cent. dry extr. xxviii, 430; Squibb: best menstruum. xxviii, 551; repercol. xxvi, 753.
- CANTHARIDES (potassa 0.85 p. c. of finished fld. extr.), Squibb. xix, 461—how to apply, Squibb. xix, 463.
- CAPSICUM, Diehl, coöperat. plan. xxvi, 694, 5, 6 (No. 26)—Squibb, repercol. xxvi, 753.
- CARDAMOMUM COMP., Squibb, repercol. xxvi, 753.
- CASCARA SAGRADA, Coit, xxix, 73—Kennedy. xxviii, 432—Vogeler. xxx, 82.
- CASTANEA VESCA (in whooping cough), Eisen-stein. xxii, 74—prep., Maisch. xxi, 131.
- CHIMAPHILA, Lloyd (glyc. advantageous). xxv, 408—Diehl: menstruum, vol. and weight equival. xxviii, 429; per cent. dry extr. xxviii, 430.
- CICHORIUM, not found on any price-list. xxii, 307.
- CIMICIFUGA, Lloyd. xxvi, 106—coöperat. plan, Diehl. xxvi, 694, 5, 6 (No. 25); Mohr. xxvi, 696, table—Squibb. xxvi, 727; best menstruum. xviii, 175; repercol. xxvi, 753.
- CINCHONA, alcohol. strength of commerc., Con-rath. xxx, 546—examin. of commerc., Grim-wood. xxiv, 411—coöperat. plan, Diehl. xxvi, 694, 5, 6 (No. 19)—deposit, Johnson. xxiv, 75—per cent. dry extr., Diehl. xxviii, 430—glycerin, advantage, Lloyd. xxv, 408—best menstruum, Diehl. xxviii, 428; Markoe. xxi, 518; Squibb. xviii, 175; xxvi, 713; Rother. (6 p. c. mur. ac.). xxii, 71; Vrij (calculat. mur. ac.). xxviii, 56—repercol., Squibb. xxvi, 98, 753—vol. and weight equival., Diehl. xxviii, 428.
- CINCHONA COMP., repercol. Squibb. xxvi, 753.
- COCA, Kennedy. xxvi, 765; Shuttleworth. xxiii, 63—repercol., Squibb. xxvi, 753.
- COLCHICUM ROOT, menstruum, vol. and weight equival., Diehl. xxviii, 428; per cent. of dry extr., Diehl. xxviii, 430.
- COLCHICUM SEED, Diehl: menstruum, vol. and weight equival. xxviii, 428; per cent. dry extr. xxviii, 430—Mols (fr. fresh seed). xxix, 72—Squibb, repercol. xxvi, 753.
- COLOMBO, Diehl, menstr., vol. and weight equival. xxviii, 428; per cent. dry extr. xxviii, 430—Squibb, repercol. xxvi, 753.
- COMPTONIA ASPLENIFOLIA (sweet fern), Chiles. xxii, 74.
- CONIUM, LEAVES, estimat. of alkaloid, Schrank. xxiv, 75
- CONIUM SEED, Diehl: menstr., vol. and weight equival. xxviii, 428; per cent of dry extr. xxviii, 430—Squibb: best menstr. xviii, 176; repercol. xxvi, 753.
- CORNUS FLORIDA, glycerin, advantage, Lloyd. xxv, 408.
- COTO bark, coöperat. plan, Diehl. xxvi, 694, 5, 6 (No. 15).

- Fluid extract COTTON ROOT, see FLUID EXTR. GOSSYPII.**
- CUBEBS, Diehl: coöperat. plan. xxvi, 694, 5, 6, (No. 6); menstr., vol. and weight equival. xxviii, 427; per cent. dry extr. xxviii, 430—Gill (spoiled by glycerin). xxi, 168—Squibb, repercol. xxvi, 753.
- CYPRIPEDIUM, Diehl: menstr., vol. and weight equival. xxviii, 427; per cent. dry extr. xxviii, 430—Squibb, repercol. xxvi, 753.
- DIGITALIS, Diehl, menstr., vol. and weight equival. xxviii, 427; per cent. dry extr. xxviii, 430—Lloyd (strong alc.). xxv, 410—Squibb, repercol. xxvi, 753.
- DOGWOOD, see FLUID EXTR. CORNUS FLORIDA.
- DULCAMARA, repercol., Squibb. xxvi, 753.
- ERGOT, alcohol. strength of commerce, Con-rath. xxx, 546—deposit, Johnson. xxiv, 75—per cent. dry extr., Diehl. xxviii, 430—for hypodermic use, Benjamin. xxiv, 692; Biroth. xxv, 77; Yvon. xxvi, 108—menstruum: Diehl (3 alc., 4 wat., acet. ac.). xxviii, 428; Lloyd (1 alc., 3 wat., no acid). xxv, 410; Markoe (U. S. '60). xxi, 518; Postans (exhaust with water., evap. and mix). xxvii, 81; Squibb (alc. dil., acet. ac.). xviii, 176—prep.: coöperat. plan, Diehl. xxvi, 694, 5, 6, 7 (Nos. 3, 30, 31, 38, 39); Mohr. xxvi, 696, table; repercol., Squibb. xxvi, 753—vol. and weight equival., Diehl. xxviii, 428.
- ERGOT, PH. BRIT., Gerrard and Linford. xxiii, 63.
- ERIODICTYON, see FLUID EXTR. YERBA SANTA.
- EUCALYPTUS GLOBULUS, deposit, Wayne. xxiv, 188—prep.: Vogeler. xxx, 82; coöperat. plan, Diehl. xxvi, 694, 5, 6, 7 (Nos. 1, 17); repercol., Squibb. xxvi, 753.
- FRANGULA, Biroth (non-alcoh.; insuccat.). xxv, 77—Squibb (repercol.). xxvi, 753—Umney (conc. decoct.). xxiii, 65.
- FUCUS VESICULOSUS. xxv, 117.
- GELSEMIUM, alcohol. strength of commerc., Con-rath. xxx, 546—coöperat. plan, Diehl. xxvi, 694, 5, 6 (No. 7)—repercolat., Squibb. xxvi, 753—menstr., vol. and weight equival., Diehl. xxviii, 427; per cent. of dry extr., xxviii, 430.
- GENTIANA (experiment with acidul. water not successful). xxi, 169—coöperat. plan, Diehl. xxvi, 694, 5, 6 (No. 4); Mohr. xxvi, 696, table—by insuccation, Biroth. xxv, 77—repercol., Squibb. xxvi, 753.
- GENTIANA COMP., repercol., Squibb. xxvi, 753.
- GERANIUM, Diehl, menstr., vol. and weight equival. xxviii, 429; per cent. dry extr. xxviii, 430—Lloyd, glycerin advantage. xxv, 408.
- GINGER, see FLUID EXTR. ZINGIBER.
- GLYCYRRHIZA, Biroth (insuccat., non-alc.). xxv, 77—Diehl, coöperat. plan. xxvi, 694, 5, 6, 7 (Nos. 13, 27)—Lloyd (1 alc., 3 wat.). xxvi, 891—Remington (a series of experiments). xxvi, 756—Squibb, repercol. xxvi, 754.
- GLYCYRRHIZA, PH. BRIT., Umney. xviii, 64.
- GOSSYPIUM, Diehl, coöperat. plan. xxvi, 694, 5, 6 (No. 11)—Lloyd, color depends much on method of percolat. xxiv, 518; examin. of com-mercial. xxiv, 76; fresh bark best; menstruum (10 alc., 6 glyc.); cause of gelatinization. xxiv, 518; glycerin of advantage. xxv, 408—Squibb, repercol. xxvi, 753—Taylor, color depends also on time of collect. xxv, 79—Wayne, deposit. xxi, 234—discussion. xxiv, 666.
- GRINDELIA ROBUSTA, Steele, xxiii, 641.
- GUARANA, Feemster. xxx, 570—Moore. xxiii, 64—coöperat. plan, Diehl. xxvi, 694, 5, 6 (No. 2); Mohr. xxvi, 696, table—repercol., Squibb. xxvi, 753.
- HÆMATOXYLUM, coöperat. plan, Mohr. xxvi, 696, table.
- HUMULUS, Vogeler. xxx, 82.
- HYDRANGÆA ARBORESCENS, King. xxv, 79.
- HYDRASTIS CANADENSIS, examin. of commer-cial, Spenser. xxx, 547—Diehl. coöperat. plan. xxvi, 694, 5, 6, 7 (Nos. 14, 22); menstr., vol. and weight equival. xxviii, 428; per cent. dry extr. xxviii, 430—Lloyd (strong alc.). xxv, 410—Squibb, repercol. xxvi, 753.
- HYDRASTIS, AQUEOUS, Hallberg. xxx, 83.
- HYOSCYAMUS, estimat. of alkaloids, Schrank.

Fluid extract (Continued).

- xxiv, 75—deposit, Johnson. xxiv, 75—coöperat. plan, Mohr. xxvi, 696, table—menstr. (strong alc.), Lloyd. xxv, 41—repercol., Squibb. xxvi, 753—menstr., vol. and weight equivalent., Diehl. xxviii, 428; per cent. dry extr. xxviii, 430.
- IPECACUANHA**, alcohol. strength of commercial, Conrath. xxx, 546—Diehl, coöperat. plan. xxvi, 694, 5, 6 (No. 5); menstr., vol. and weight equivalent. xxviii, 427; per cent. dry extr. xxviii, 430—Lloyd (separate resin with water). xxv, 411—Mattison (145° F.; twice filtered). xxii, 72—Robbins (3 alc., 1 wat.). xxviii, 54—Snelling (repercol. glyc., wat.). xxviii, 55—Squibb, menstr. xviii, 176; repercol. xxvi, 753—Watts (separate resin with wat.). xxv, 78.
- JABORANDI**, Diehl, coöperat. plan. xxvi, 694, 5, 6 (No. 20)—Greene (sand on top). xxvi, 109—Kennedy (75 p. c. alc.). xxix, 421, 3—Squibb, repercol. xxvi, 754.
- JAMAICA DOGWOOD**, Lemberger. xxx, 82.
- JUGLANS NIGRA**, Squibb (repercol.). xxvi, 753.
- JUNIPERUS**, Squibb (repercol.). xxvi, 753.
- KRAMERIA**, Biroth (non-alc., insuccat.). xxv, 77—Diehl, menstr., vol. and weight equivalent. xxviii, 429; per cent. dry extr. xxviii, 430—Lloyd (glyc. advantage). xxv, 408—Squibb, repercolat. xxvi, 754.
- LACTUCARIUM**, Diehl, menstr., vol. and weight equivalent. xxviii, 428; per cent. dry extract. xxviii, 430—Lemberger (benzin). xxvi, 763—Squibb, repercol. xxvi, 754—discussion. xxvi, 897.
- LEPTANDRA**, Diehl, menstr., vol. and weight equivalent. xxviii, 429; per cent. dry extr. xxviii, 430—Squibb, repercol. xxvi, 754.
- LOBELIA**, coöperat. plan, Diehl. xxvi, 694, 5, 6 (No. 18).
- LUPULIN**, Sarrazin. xxiii, 65—spoiled by glycerin, Gill. xxi, 168—coöperat. plan, Diehl. xxvi, 694, 5, 6 (No. 9)—repercol., Squibb. xxvi, 754.
- MATÉ**, Robbins. xxvi, 305.
- MATICO**, Lloyd, strong alc. xxv, 410; glyc. advantage. xxv, 408.
- MEZEREON**, Diehl, menstr., vol. and weight equivalent. xxviii, 427; per cent. dry extr. xxviii, 430.
- NUX VOMICA**, estimat. of alkaloids, Schrank. xxiv, 75—Diehl, coöperat. plan. xxvi, 694, 5, 6 (No. 33); menstr., vol. and weight equivalent. xxviii, 427; per cent. dry extr. xxviii, 430—Squibb, repercol. xxvi, 754.
- OPIUM**, PH. BRIT., strength, Shuttleworth. xxiv, 181.
- ORANGE**, see **FLUID EXTR. AURANT., CORT.**
- PARAIRA**, Squibb, menstr. xviii, 176; repercol. xxvi, 754.
- PARAIRA**, PH. BRIT., Proctor. xxv, 78.
- PHYSOSTIGMA**, see **FLUID EXTR. CALABAR BEAN.**
- PHYTOLACCA**, Gill (spoiled by glyc.). xxi, 168—prep., Polk. xxiii, 66; Vogeler. xxx, 82.
- PILOCARPUS**, see **FLUID EXTR. JABORANDI.**
- PISCIDIA ERYTHRINA**, see **FLUID EXTR. JAMAICA DOGWOOD.**
- PLEURISY**, see **FLUID EXTR. ASCLEPIAS TUBEROSA.**
- PODOPHYLLUM**, Diehl, menstr., vol. and weight equivalent. xxviii, 427; per cent. dry extr. xxviii, 430—Squibb, repercol. xxvi, 754.
- POKE**, see **FLUID EXTR. PHYTOLACCA.**
- PRICKLY ASH**, see **FLUID EXTR. XANTHOXYLON.**
- PRUNUS VIRGINIANA**, alcohol. strength of commercial, Conrath. xxx, 546—menstruum; Grahame (Shinn). xxvi, 883; Higgate. xxvii, 80; Lloyd. xxv, 408; Luhn. xxvi, 884; Moore. xxix, 72; Powers. xxi, 170; Smith. xxiv, 76; Squibb. xviii, 177—repercol., Squibb. xxvi, 754—discussion. xxvi, 883.
- QUASSIA**, repercol., Squibb. xxvi, 754.
- QUEBRACHO**, Vogeler. xxx, 82.
- RHAMNIS PURSHIANA**, see **FLUID EXTR. CASCARA SAGRADA.**
- RHATANY**, see **FLUID EXTR. KRAMERIA.**
- RHEUM**, Diehl, coöperat. plan. xxvi, 694, 5, 6,

Fluid extract (Continued).

- 7 (Nos. 40, 41); menstr., vol. and weight equivalent. xxviii, 428; per cent. dry extr. xxviii, 43.—Rother (ammonia). xxi, 170—Squibb., menstruum. xviii, 177; repercol. xxvi, 754.
- RHEUM, AQUOUS**, Bille. xxi, 169.
- RHUS AROMATICA**, Harper. xxix, 230.
- ROSA**, menstr., vol. and weight equivalent. xxviii, 429; per cent. dry extr. xxviii, 430.
- RUBUS**, Diehl, menstr., vol. and weight equivalent. xxviii, 429; per cent. dry extr. xxviii, 430—Lloyd (glycerin). xxv, 408.
- RUBUS COMP.**, Polk. xxiii, 64.
- SANGUINARIA**, Diehl, menstr., vol. and weight equivalent. xxviii, 428; per cent. dry extr. xxviii, 430—Squibb, repercol. xxvi, 754.
- SARSAPARILLA**, Judge (deposit, menstruum). xxi, 596; xxii, 73—Diehl. xxi, 100—Squibb. xviii, 177; repercol. xxvi, 754.
- SARSAPARILLA**, PH. BRIT., Barton. xxiii, 66.
- SARSAPARILLA COMP.**, Markoe (objects to mezereon). xxi, 518—Schiller (without guaiac). xxvi, 140—Squibb, menstruum, xviii, 177; repercol. xxvi, 754.
- SCILLA**, see **FLUID EXTR. SQUILL.**
- SCUTELLARIA**, Squibb (repercol.). xxvi, 754.
- SENEGA**, alcohol. strength of commercial, Conrath. xxx, 546—Biroth (non-alcohol., insuccat.). xxv, 77—Diehl (menstr., vol. and weight equivalent.). xxviii, 428; (per cent. dry extr.). xxviii, 430—Kennedy (ammonia). xxvii, 721—Markoe (alkali). xxi, 519—Rittenhouse (bicarb. sod.). xix, 453—Robbins (four diff. methods). xxvii, 79—Squibb (ammonia). xix, 454; (repercol.). xxvi, 754—discussion. xix, 115.
- SENNA**, alcohol., strength of commercial, Conrath. xxx, 546—coöperat. plan, Diehl. xxvi, 694, 5, 6, 7 (Nos. 21, 28, 29); Mohr. xxvi, 696, table—Biroth (non-alcohol., insuccat.). xxv, 77—Diehl (menstr., vol. and weight equivalent.). xxviii, 428; (per cent. dry extr.). xxviii, 430—Markoe (dil. alc.). xxi, 519—Neynaber (1 alc., 4 wat.). xxv, 78—Robbins (four diff. methods). xxvii, 79—Squibb (dil. alc.). xviii, 178; (repercol.). xxvi, 754.
- SENNA, AQUEOUS**, Vogeler. xxii, 72.
- SENNA, DEODORIZED**, Diehl. xxiv, 76.
- SENNA COMP.**, Squibb (repercol.). xxvi, 754.
- SERPENTARIA**, Squibb (repercol.). xxvi, 754.
- SPIGELIA**, Diehl, menstr., vol. and weight equivalent. xxviii, 428; per cent. dry extr. xxviii, 430—Squibb, repercol. xxvi, 754.
- SPIGELIA and SENNA**, repercol., Squibb. xxvi, 754.
- SQUILL**, Diehl, menstr., vol. and weight equivalent. xxviii, 427; per cent. dry extract. xxviii, 430—Squibb, repercol. xxvi, 754.
- STILLINGIA**, Lloyd (strong alc.). xxv, 410—Mohr (coöperat. plan). xxvi, 696, table—Polk, (alc., glyc.). xxiii, 66—Squibb (repercol.). xxvi, 754.
- STILLINGIA COMP.**, Polk. xxiii, 66.
- STRAMONIUM**, leaves, estimat. of alkaloids, Schrank. xxiv, 75.
- STRAMONIUM SEED**, repercol., Squibb. xxvi, 754.
- SUMACH BERRIES**, Remington. xxii, 73.
- TARAXACUM**, often made fr. chicory. xxii, 551—Biroth (non-alcohol., insuccat.). xxv, 76—coöperat. plan, Diehl. xxvi, 694, 5, 6, 7 (Nos. 10, 23, 24, 36, 37); Mohr. xxvi, 696, table—repercol., Squibb. xxvi, 753.
- TEA**, Fairthorne. xxx, 83.
- THUJA OCCIDENTALIS**, Lawes. xxvi, 108.
- UVA URSI**, Diehl (menstr., vol. and weight equivalent.). xxviii, 429; (per cent. dry extr.). xxviii, 430—Lloyd (glycerin advantage). xxv, 408—Mohr (coöperat. plan) xxvi, 696, table—Squibb. xxvi, 754.
- VALERIANA**, alcohol. strength, Conrath. xxx, 546—Bond, glycerin. xxi, 170; (not recommended by Gill. xxi, 168)—Diehl, menstr., vol. and weight equivalent. xxviii, 428; per cent. dry extr. xxviii, 430—Mohr, coöperat. plan. xxvi, 696, table—Squibb. xviii, 179; repercol. xxvi, 754.
- VANILLA**, see **EXTRACT VANILLA.**

- Fluid extract** VERATRUM VIRIDE, estimat. of alkaloids, Schrank. xxiv, 75—prep., Squibb. xviii, 179; repercol. xxvi, 754.
- VIBURNUM PRUNIFOLIUM, Vogeler. xxx, 82.
- WHITE ASH BARK, Edwards. xxx, 83.
- WILD CHERRY, see FLUID EXTR. PRUNUS VIRGINIANA.
- XANTHOXYLON, repercol., Squibb. xxvi, 754.
- YERBA SANTA, Mohr. xxvii, 740—Vogeler. xxx, 82—Wellcome. xxiv, 135—coöperat. plan, Diehl, xxvi, 694, 5, 6, 7 (Nos. 34, 35).
- ZINGIBER, Diehl menstr., vol. and weight equiv. xxviii, 427; per cent. dry extr. xxviii, 430—Gill, glycerin advantage. xxi, 168—Mohr. coöperat. plan. xxvi, 696, table—Squibb (So. African best). xviii, 179; repercol. xxvi, 753.
- Fluid volume of solids**, Candidus. xxviii, 420—discussion. xxviii, 553.
- Flumaria officinalis**, Chili. xxiv, 766.
- Fluorene**, prop., Barbier. xxii, 212.
- Fluorescein**, as alkalimetric test. xxv, 242.
- Fluorescence**, sketch. xix, 133—of coloring matter in castor oil, Horner. xxiii, 460—only blue color emitted fr. solutions, Morton. xxi, 141.
- Fluorine**. xxi, 285; xxiv, 221; xxvii, 321; xxix, 250; xxx, 277.
- estimat. (as hydrofluosilicic ac.), Penfield. xxvii, 312—occurs free in fluorspar, Löw. xxx, 277.
- Fly paper**, sticky, Nessler. xxviii, 94.
- Fly plant**—Mimulus glutinosus, California. xxvi, 698; xxvii, 609.
- Föhre**, GEMBINE—Pinus sylvestris;—F. SCHWARZ,—Pinus laricis;—F., WEISS,—Pinus sylvestris. xxvi, 317.
- Foeniculum panmorum**, India. xxiv, 721.
- VULGARE, Japan, descript., Holmes. xxviii, 159.
- See also FENNEL.
- Folger, W. S.** xxiv, 683.
- Fomentations**, HOT (wet flax-seed meal on a stove). xxx, 128.
- Food**, CANNED, contamin. with tin, Menke. xxvii, 119.
- CHEMICAL, for plants. xxx, 137.
- INFANT, of commerce, analysis, Gerber. xxvii, 118—Skalweit. xxvii, 119.
- Force pump**, stoneware, Doulton's. xxv, 363.
- Ford, W. T.** Medicinal prep. of drugs. xxvii, 734.
- Forest trees** of California. xxvii, 599.
- TROPICAL, diversity, Agassiz. xxvii, 822, note.
- Formen**, act. of ozone, Mailfert. xxx, 259—of heated platin. and pallad. coils, Coquillon. xxii, 208.
- Formulas**, UNOFFICIAL, Brown. xx, 207—Hancock. xxi, 119; xxii, 338—Moore. xix, 350—discussion. xviii, 63; xxiii, 775.
- improvements, state what is aimed at, Oldberg. xxi, 583.
- Forphyra vulgaris**, as "greens" by Pacific Indians. xxvii, 134.
- Forsythia suspensa**, China. xxiv, 749.
- Fowler's solution**, see SOLUTION POTASSIUM ARSENITE.
- Fragaria vesca**, examin. of root, Phipson. xxvii, 240.
- Fragarianin**, prop., Phipson. xxvii, 240.
- Fragarin**, Phipson. xxvii, 240.
- France**, chemicals, Centen. exhibit. xxiv, 787—perfumery. xxiv, 822; xxvii, 385—pharmaceut. prep., Centen. exhibit. xxiv, 807—pharmacy, Baudrimont and Barbet. xxii, 29.
- Frangula bark**, yield of amygdalin. xxiii, 437—old bark cont. emodin, Liebermann and Waldstein. xxv, 320—as cathartic, Giles. xxiii, 219.
- CALIFORNICA. xix, 300.
- Frangulin**, constitution, Faust. xviii, 286; xxii, 285.
- Frankenia grandifolia**, California. xxvi, 698, 707; xxvii, 613.
- Frankincense**, COMMON—Galipot. xxvi, 324.
- Frasera walteri**, cont. no berberin, Kennedy. xxii, 114; but gentiopicroin and gentisic acid, Kennedy. xxi, 635; xxix, 155—coloring principle, Lloyd. xxviii, 134—should be called American gentian, Kennedy. xxi, 637.
- Fraxinus americana**, descript. of bark and constituents, Edwards; Bradford. xxx, 168—alkaloid, Power and Edwards. xxx, 168—in Kansas. xxix, 448.
- CHINENSIS. yields China (pela) wax. xxviii, 293.
- EXCELSIOR, leaves cont. inosit, Gintl. xviii, 289—in Italy. xxviii, 125.
- OREGONA, California. xix, 305.
- ORNUS, Italy. xviii, 288; xxvii, 125—see also MANNA.
- PUBESCENS;—F. QUADRANGULATA, Kansas. xxix, 448.
- ROTUNDIFOLIA. xviii, 288—cannot be distinguished fr. F. ornus, Hanbury. xxi, 219—see also MANNA.
- Freckles**, collodion, Hager. xxiii, 49; xxiv, 68; xxvii, 122.
- Fredigke, Chs. C.**, home-made chem. and pharmac. prep. xx, 200—gelseminin and gelseminic acid. xxi, 652.
- Freezing mixture**, Finzelberg. xxix, 59—methylic ether. xxiii, 350—effectiveness depends on relative amount of salts and solvents, Rüdorff. xxii, 53—of saline solut., does not depend on solubil., nor on crystallizability of the salt, Wittstein. xix, 317.
- French berries** (Rhamnus insectoria), analysis, Stein. xix, 271.
- Fringe tree rootbark** (chionanthes), adult. of powd. xxx, 576.
- Fritillaria imperialis**, starch fr. bulbs in France. xxi, 351.
- THUNBERGII, Japan. xxviii, 100; descript., Holmes. xxviii, 110.
- Frog poison** (arrow poison in Columbia), André. xxix, 238.
- Frost bites**, Barnes. xxix, 74.
- Fruits**, relative format. of sugar and malic acid, Mercadante. xxiv, 316.
- CANNED, fraudulent weight. xxi, 503.
- Fruita da araku**=fruit of Anda braziliensis. xxvii, 267.
- DE GENTIO=a cucurbitacea, Brazil. xxiii, 121.
- DE BURRO=fruit of Xylopia longifolia. xxvi, 250.
- Fuchsia**, amount of sugar in nectar, Wilson. xxvii, 442.
- EXCORTICATA, New Zealand. xxiv, 737.
- Fuchsin** adult. (sugar up to 82 p. c.). xxi, 502—therapeut. value, Feltz. xxvii, 253—tree fr. arsenic, Jegel. xxiii, 429—detect. of arsenic, Rieckher. xviii, 250—coloring power, Küpfer. xxiv, 383—test (fusel oil), Romis. xxi, 385; in fruit syrups, Vandevyvere. xviii, 210; Puscher. xxii, 273; in wine, Chancel. xxvi, 266; Pasteur and Wurtz. xxvi, 267.
- Fucus amylaceus**, analysis, Greenish. xxx, 139.
- HELMINTOCHORTON, of commerce seldom contains it, Greenish. xxx, 141.
- NATANS. xxv, 117.
- NODOSUS. xxv, 117—yield of kelp and iodine. xxvii, 133, 4; xxx, 139—descript. xxvi, 175.
- SERRATUS. xxv, 117; xxvi, 176; xxx, 139—yield of kelp and iodine. xxvii, 133, 4.
- SILIQUOSUS. xxv, 117.
- VESICULOSUS. xxv, 26—analysis of plant and ash, Frisby. xxix, 117—as anti-fat, Duchesne-Duparc. xxvi, 173—drug market. xxvi, 661; xxviii, 372—history. xxv, 116—yield of kelp and iodine. xxvii, 133, 4; xxx, 139.
- Fuku**=Eulalia japonica, Japan. xxviii, 104.
- Fuligokali**, Ebert. xxiii, 55.
- Fulmar glacialis**. xix, 153.
- Fumaria officinalis**, Chili. xxiv, 766.
- PARVIFLORA, India. xxvi, 159.
- Fumariaceae** of California. xix, 299—Kansas. xxix, 445.
- Fund**, CENTENNIAL. xxv, 480, 481, 526, 528; xxvii, 805—Luhn. xxvii, 751—history. xxvii, 782.
- fr. surplus of Arrangement Committee. xxvi, 701—discussion. xxv, 528.
- SINKING, see SINKING FUND.
- Fungi**. xviii, 273; xix, 262; xxi, 203; xxii, 94; xxiii, 122; xxiv, 117; xxv, 117; xxvi, 177; xxvii, 135; xxviii, 101; xxix, 118; xxx, 141—of New Zealand. xxiv, 738; xxx, 145.

- Fungi**, cont. oxalic ac., Hamlet and Plowright. xxvi, 177—descript. and systemat. arrangement, Stuart. xxv, 177—peculiar sugar, neither mannit nor trehalose, Würz. xxii, 94.
- Fung-shu**, China. xxiv, 744.
- Funnel**, steam, Abraham. xxx, 48—separatory, Bulk. xxv, 43; Donnell. xxiv, 49—for rapid filtration, Geissler. xxix, 38; Hempel. xxiv, 55—of papier-maché. xxx, 56.
- Fun-sô**—Calomel, Japan. xxiv, 261.
- Furfurol**, act. of anilin. and mur. ac., Förster. xxx, 350.
- Furniture-polish**, Niedlig. xxii, 54.
- Fusel oil**, see ALCOHOL AMYLIC.
- Fustic**—*Maclurea tinctoria*. xxiv, 736—fr. *Rhus cotinus*. xxix, 225.
- Fu-tze**—a spec. of aconite, China. xxix, 173, 5.
- Fuyu-avi**—*Malva pulchella*, Japan. xxviii, 169.
- G.**
- Gadberry's SPLFEN MIXTURE**. xxvii, 96.
- Gah-ditz**—*Curcuma zerumbet*, Japan. xxviii, 114.
- Gaja marioba**—*Cassia occidentalis*, Brazil. xxvi, 169.
- Galactin** = in juice fr. *Brosimum galactodendron*, Venezuela. xxvii, 274—fr. leguminous seed, Muntz. xxx, 368.
- Galactodendron UTILIS**, account, Venezuela. xxvii, 274.
- Galactose "α"** of Fudakowski. xxx, 369.
- of Fudakowski. xxiv, 318.
- Galangal**, yellow coloring matter, Jahns. xxx, 153, 447—in China. xxiv, 747.
- Galangin**, coloring matter fr. galangal, Jahns. xxx, 448.
- Galatzidae**—spec. of *Euphorbia*, Greece. xxvii, 266.
- Galbanum**, adult. (rosin, turpentine). xxv, 512—behavior to reagents, Hirschsohn. xxvi, 453—9—purified, Dieterich. xxvii, 397—in 1610. xix, 492.
- PERSIAN, account, Dymock. xxvii, 193.
- Galen**. xxv, 476.
- Galena**, act. of bisulphate potassium, Jannetaz. xxii, 200—wet assay, Storer. xviii, 239.
- Galium ANDREWSII**, California. xix, 302;—*G. APARINE*, Kansas. xxix, 450;—*G. CALIFORNICUM*. xix, 302;—*G. CHILENSE*, Chili. xxiv, 766;—*G. CIRCEZANS*;—*G. TINCTORIUM*;—*G. TRIFIDUM*, Kansas. xxix, 450.
- Galipot** (turpentine). xxiv, 319—composition. xxiv, 325—extraction, prop., Morel. xxvi, 324.
- Galls, AMERICAN**, as source for gallic ac., Squibb. xxi, 88—cont. 23 p. c. tannin, Maisch. xxii, 499—discussion. xxi, 88.
- , CHINESE, distinguishing characters, Hartwich. xxx, 247.
- , JAPANESE, dist. characters, Hartwich. xxx, 247.
- , KAKRASINGHU, dist. char., Hartwich. xxx, 247—fr. *Rhus succedanea*. xxiv, 194.
- , PEAR, dist. char., Hartwich. xxx, 247.
- of RHUS SUCCEDANEA, Dymock. xxiv, 194—Kakrasinghu. xxx, 247.
- , TAMARISK fr. *Tamarix articulata*, Morocco, account, Holmes. xxvi, 281.
- Gallæ ESCULENTÆ** fr. *Salvia pomifera*, Greece. xxix, 141.
- Gallium**. xxiv, 250; xxvii, 352.
- prop., Boisbaudran. xxv, 268; xxvi, 429—Dupré. xxvi, 430—prep. fr. zinc ore, Boisbaudran. xxiv, 250; Jungfleisch. xxvii, 352.
- and ALUMINIUM alloy, Boisbaudran. xxvi, 430.
- Gallon**, what is it? Squibb. xxi, 561.
- Gamboge**, mineral adult. detect. by chlorof., Siebold. xxviii, 278—behavior to reagents, Hirschsohn. xxvi, 453—9—coloring power, Küpfer. xxiv, 382—examin. of resin and gum, Costelo. xxvii, 209, 210.
- Ganasur**—*Croton oblongifolia*, India. xxviii, 193.
- Gaoshir**—gum resin of *Ferula galbanum*, Persia. xxvii, 193.
- Garcinia INDICA**, uses of fruit and expressed fat in India, Dymock. xxvi, 165.
- MANGOSTANA, India, in diarrhoea. xxv, 373.
- PICTORIA, India. xxiv, 718.
- PURPUREA, India, yields cocum butter. xxiv, 725.
- Gardenia FLORIDA**, Japan. xxiii, 120; descript., Holmes. xxviii, 157.
- GUMMIFERA, India. xxiv, 718—descript. and prop. of gum, Dymock. xxv, 163.
- LUCIDA. xxviii, 272—prop. and uses of gum in India, Dymock. xxv, 163.
- Gardenin**, fr. Dikamali resin, Stenhouse. xxv, 164; xxviii, 272.
- Gardner, R. H.** Elixirs. xxviii, 439—liq. ferri protoxidi. xx, 218—improve the practice of pharmacy. xxiii, 569.
- discussions: xx, 81; xxiii, 775, 776, 784, 785, 786, 789, 797; xxv, 523; xxvii, 758, 796.
- Garipot**—galipot. xxvi, 324.
- Garlic**, adult. xxiii, 500—how to keep, Procter. xxii, 529—uses in the Orient, xxiv, 123; xxvii, 141.
- Garrigues, S. S.** American bromine. xxi, 650—insect powder, mode of action. xix, 505—on pharmacy law in Michigan. xxv, 394.
- discussion: xx, 78; xxi, 88.
- Garrison, H. D.** Antiseptics. xxiv, 688—report on exhibit. xxvii, 678.
- Garroo WOOD**—*Aquilaria agallochum*, account. China. xxiv, 755.
- Garrya LUXIFOLIA**;—*G. ELLIPTICA*, California. xix, 306.
- FREMONTII, Calif. xix, 306; xxvii, 611—active principle, Ross. xxvi, 172.
- Garryaceæ**, of California. xix, 306.
- Garryina**, Ross. xxvi, 172.
- Garuga PINNATA**, India. xxiv, 195.
- Gas ABSORBER**. Gore. xxvi, 83.
- ILLUMINATING, cont. benzol, Caro. xix, 240—poor, improved by heating, Cremin. xxi, 152—fr. petrol. residues, Hirzel. xix, 239.
- TIGHT JOINT (mercury seal), Karsten. xxi, 197.
- BURNER. See also BURNER.
- BURNER (modif. Bunsen), Pribram. xxii, 39—Stöckmann. xxiii, 26—Terquem. xxix, 47—Wolcott-Gibbs. xxii, 40—for high temp., Muencke. xxx, 49—universal, Muencke. xxii, 40; Rabs. xxiii, 28.
- DELIVERY TUBE, Vulpius. xxviii, 328.
- GENERATOR, regulating, Süß. xxvi, 81; Woodward. xxii, 42—with blowpipe, Thompson. xxvi, 82—constant, Kämmerer. xxv, 54.
- Gasolin and benzin**, distinct. xxvi, 883—behav. to bromine, Allen. xxx, 314. See also PETROLEUM ETHER.
- Gastric JUICE**, functions, Richet. xxvi, 631—natural, in emulsion, Neynaber. xxix, 363.
- Gastrolabin**, poisonous, Müller and Rummel. xxviii, 346.
- Gastrolobium BILLOBUM**, Australia. xxviii, 346.
- Gaub fruit**—*Embryopteris glutiniferum*, India. xxiv, 725.
- Gauging**, evils of, Squibb. xxi, 551.
- Gaultheria LEUCOCARPA**, Japan, cont. kinic acid, Vrij. xxi, 223—oil. xxi, 223; xxvii, 393.
- PUNCTATA, Japan, cont. kinic ac., Vrij. xxi, 223—oil. xxi, 223; xxvii, 393—oil as source of salicylic acid. xxv, 291.
- SHALLOW, California. xix, 303.
- Gaultherilen**. xxii, 747.
- Gauze ANTISEPTIC**, Lehn. xxix, 109—Mercières. xxix, 110.
- BENZOIC ACID, Bruns. xxvii, 120.
- CARBOLIC. xxix, 109; Bruns. xxvii, 120.
- EUCALYPTUS. xxx, 129.
- SALICYLIC AC., Bruns. xxvii, 120.
- Gavala**—a spec. of cherry, India, descript., Dymock. xxv, 207.
- Gay feathers**—*Liatris scariosa*, Kansas. xxix, 442.
- Geber**. xxv, 477.
- Gedanite**—"unripe" amber, Helm. xxvii, 396.
- Geeno**—root of spec. of *Leea*, India, descript., Dymock. xxvi, 163.
- Geissler tubes**, sulphur rays accounted for. xxx, 267.
- Geissospermia**, Hesse. xxvi, 217—impure (=per-cirine), Bochefontaine. xxvi, 217.
- Geissospermum LÆVE**, Brazil account, Bochefontaine and Freitas. xxvi, 217.
- VELLOSI, Brazil. xxvi, 217.

- Gelatin**, Germany. xxiv, 800—yields a trace of aldehyd with bichromate mixt., Staedeler. xxvii, 398—fr. feet of neat catile, Renze. xxii, 285—old, soluble in saccharated lime. xxi, 354.
 — **CALABARIZED**, Kennedy. xxiii, 605.
 — **"EXPLOSIVE,"** Nobel. xxvii, 420.
 — **MEDICATED**, Almén. xviii, 208; xix, 164—Limousin. xxiii, 107.
 — **VEGETABLE** (Agar-agar). Marchand. xxix, 118.
Gelidium CORNEUM. xxvi, 173—found in commercial Corsican moss. xxx, 1, 1.
Gelose prop., Morin. xxix, 118—fr. *Fucus amylaceus*, Greenish. xxx, 139—fr. *Gelidium corneum*. Payen. xxvi, 173.
Gelseminina, prep., prop., Fredigke. xxi, 654; xxii, 105; Robbins. xxv, 135; Wormley. xviii, 276—toxic effects, Wormley. xxv, 312.
Gelsemin (ELECTRIC) solubility, Parker. xxx, 128.
Gelsemium SEMPERVIRENS, active constituents—Robbins. xxv, 135; Wormley. xviii, 276—ext traction, Dragendorff. xxvi, 86—fluid extrac, useless as paint for eruption of poison oak, Johnson. xxv, 218—review, Holmes. xxiv, 132—not attacked by *Tinea zæ*, Saunders. xxi, 627.
Gemmage À VIE, France. xxvi, 319.
Gemme À PIN PERDU, France. xxvi, 319.
 — **À MORT**, France. xxvi, 319.
Gendarussa, China. xxiv, 749.
Genees blaaren = *Solanum nigrum*, Cape Good Hope. xxiv, 738.
Generator, STEAM, Garrison. xxx, 44.
 — See also **GAS GENERATOR**.
Genth, F. A. Letter about cinchoquinine. xxii, 645.
Gentian, adult. of powd. xxx, 576—detect. in beer, Dragendorff. xxx, 340; Wittstein. xxiii, 341—collected both fr. *G. lutea* and *G. punctata*, Corder. xxviii, 133—cont. gentianose, Meyer. xxx, 178, 378—germinat. of seed, Saunders. xxx, 567—causes of react. with iron, Maisch. xxix, 504; (due to gentisic ac.), Kennedy. xxix, 156; (tannin) Davies. xxviii, 132; (denied) Maisch. xxiv, 136; xxv, 147; xxviii, 132; (asserted) Patch. xxiv, 135; (assertion modified, due to gentisic ac.) Patch. xxix, 457; discussion. xxix, 504—not attacked by *Tinea zæ*, Saunders. xxi, 627—in China. xxiv, 758.
 —, **CHINESE** = *Gentiana erythraea*. xxiv, 747.
 — and **KHUBARB DRAUGHT**. xxvi, 126.
Gentiana BURGERI, Japan. xxviii, 100—descript., Holmes. xxviii, 134.
 — **BURSERI**, analysis, Ville. xxvi, 222.
 — **CATESBAEI**, substit. by root of *Triosteum perfoliatum*. xxiii, 501—cont. no tannin, Maisch. xxv, 147.
 — **CRINITA**, cont. no tannin, Maisch. xxv, 147.
 — **ERYTHRAEA**, China. xxiv, 747.
 — **PUNCTATA**, one of the sources of gentian root. xxviii, 133.
 — **SAPONARIA**, Kansas. xxix, 445.
Gentianaceæ. xviii, 278; xix, 287; xxii, 114; xxiii, 163; xxiv, 135; xxv, 147; xxvi, 222; xxviii, 132; xxix, 155; xxx, 178; of California. xix, 305; Kansas. xxix, 445; Mexico. xxiv, 773.
Gentianin (=gentisin) related to maclurin, Hlasiwetz and Habermann. xxiii, 449; xxiv, 373—ought to be called gentio-tannic acid, Ville. xxvi, 222.
Gentianose, Meyer. xxx, 378.
Gentisin, see **GENTIANIN**.
Gentiopiecin, detect. in beer, Wittstein. xxiii, 341; Dragendorff. xxx, 340—difficult to obtain fr. dried roots, Patch. xxx, 568—should be called gentianin; fr. *Fraseri Walteri*, Kennedy. xxi, 637.
Geoffroya VERMIFUGA, Brazil. xxvi, 294.
Georgetown Coll. of Pharmacy, D.C., objections to admissib. of its delegates. xx, 47; 69.
Georgia, Pharmacy Law (since 1824). xxii, 331; xxx, 475, 483—pharmaceut. associat., status. xxv, 518—flora. xxvi, 702.
Georgia BARK = *Pinckneya pubescens*, descript. xxix, 166.
Geraniaceæ. xix, 268; xxx, 214; of California. xix, 300; Kansas. xxix, 445.
Geranium, SWEET, Australia. xxviii, 100.
 — **WILD** = *Erodium cicutarium*, California. xxvii, 654.
 — **CAROLINIANUM**, California. xix, 300; Kansas. xxix, 445.
 — **MACULATUM**, not attacked by *Tinea zæ*, Saunders. xxi, 627—in Kansas. xxix, 445.
Gerardia QUERCIFOLIA, Missouri, antidote to snake poisoning, Maisch. xxii, 105.
Germander = *Teucrium canadensis*, Kansas. xxix, 446.
Germany, Centen. exhibit.: chemicals. xxiv, 787; drugs. xxiv, 742; phar. prep. xxiv, 838—pharmacopœia. xix, 315—pharmacy, Hlasiwetz; Hoffmann. xxii, 26.
Germination of SEEDS, Saunders. xxx, 567, 647.
Gesengebin = *Astragalus manna*, Persia. xix, 284.
Geum JAPONICUM, descript., Japan, Holmes. xxviii, 180.
 — **VIRGINIANUM**, Kansas. xxix, 450.
Geysers of CALIFORNIA. xxvii, 614, 618.
Ghâfith = *Eupatorium cannabinum*, Arabia. xxviii, 133.
Ghaimari = *Kalanchoe pinnata*, India. xxv, 196.
Ghanda-virozah = turpentine fr. *Pinus longitolia*, India. xxvii, 198.
Gharbhuli = a spec. of *datura*, India, descript., Dymock. xxv, 138.
Gharikien = *Polyporus officinalis*, India. xxvi, 162.
Ghati = *Solanum nigrum*, India. xxviii, 120.
 — **pitpatra** = *Peristrophe bicalyculata*, India. xxvi, 159.
Ghattea = aal root, India. xxiv, 717.
Ghausal = *Scilla maritima*, Malta. xxvi, 168.
Ghelaphul = *Randia dumetorum*, India. xxv, 164.
Ghul khairo = flowers of *Althaea off.*, India. xxvi, 162.
Giddy berry = *Viburnum Lantana*, descript. and uses, Maisch. xxvi, 243.
Gigartina ACICULARIS, found in Irish moss. xxii, 96, 307.
 — **SPHAEROCOCCUS**, found in Corsican moss. xxx, 141.
Gilding, Mouvel. xxiv, 266.
Gillenia TRIFOLIATA, not obtainable, but *G. STIPULACEA*, Ebert; Maisch. xviii, 67.
Gingelly = *Sesamum indicum*, in Jamaica, account. xxiv, 732.
Ginger, adult. of powd. xxx, 576; xxiii, 137; xxi, 486—analysis (Jamaica, African, Cochin China), Thresh. xxviii, 112; xxx, 153—bleached (2 p. c. whitewash). xxii, 308—cultivat., India. xxiv, 720; Jamaica. xxiv, 735—cont. gingerol, Buchheim. xxii, 101—history, Sheppard. xxiv, 125—examin. of resin, Stenhouse and Groves. xxvi, 193.
 — **leaf** = *Eremocarpus setigerus*, California. xxvi, 698; xxx, 250.
Gingerol, Buchheim. xxii, 101; Thresh. xxviii, 112, 4; xxx, 153.
Ginkor = *Salisburia adiantifolia*, China. xxv, 235.
Ginseng, drug market. xxi, 440, xxii, 618, 643; xxvii, 585—uses in China, Jackson. xxiv, 155—Indiana. xxviii, 502—Japan, Rein. xxix, 168—Ohio. xxviii, 503.
 —, **BAMBOO-KNOTTED**, = *Arabia edulis*, Japan. xxviii, 161.
Girasol, Arg. Republ. xxiv, 762.
Gizzard, FOWL'S, in spermatorrhea and urinary disorders, China. xxiv, 748.
Glass, BLACK stain (iridium oxide). xviii, 242.
 — **CEMENT**, (bichrom. glue) Schwarz. xxiv, 113. See **CEMENT**.
 — vessels, **CLEANED** (permang., mur. ac.) Walz. xxi, 195.
 — **CRYSTALLIZED**, analysis, Peligot. xxiii, 258.
 — cut and bored, (camphor in turp.) xix, 170—(charcoal pencil). xxix, 54—(steel file). xix, 170—gilded, Boettger. xix, 168.
 — **HARDENED**, Bastie; Bauer. xxiii, 258—poorly tempered, Martial; Laurent. xxvii, 55, 6.
 — **NON-ACTINIC**, Wilder. xxv, 58.
 — orange-colored as protect. to ess. oils, Procter, Jr., xxi, 629—Pittsburg market. xxi, 445—platinized, Boettger. xviii, 242—silvered. xxviii, 93; Siemens. xxi, 154.

Glass, PHOSPHATE OF LIME, is not affected by hydrofluoric ac., Sidot. xxvi, 387.
 — fr. SLAG, Britten. xxvii, 316.
 — ware, manufacture (Whitall, Tatum & Co.), Smith. xx, 90.
 — ROHEMIAN, water dissolves out alkali, Truchot. xxiii, 35.
 — in California. xxvii, 624.
 —, BOTTLE-, fr. diff. countries, examin., Macagno. xxvii, 315.
 — FELT as filter, Wei-skopf. xxi, 152.
 — TUBES, English, yield lead (to the combined infl. of steam and carbon. ac.), Parsons. xxiv, 60—bending (sand). xxii, 48.
 — COTTON (wool), Sellers. xxi, 152—Hildwein. xxii, 49—fineness of fibre. xxvi, 362.
 — WRITING ink, Slocum. xxix, 55—writing pencils. xxvii, 128.
 — WORT=Sueda Californica. xxvii, 285.
Glauber. xxv, 478.
 — salt. See SODIUM SULPHATE.
Glaux MARITIMA, California. xix, 304.
Glaze for earthenware, free from lead, Constantin. xxiv, 63—Jaunasch. xxv, 57.
 — See also ENAMEL.
Glechoma HEDERACEA is the "asarum" of Hildgardis. xxviii, 466—uses in Malta. xxvi, 168.
Gleditschia CHINENSIS, China. xxiv, 745, 759.
 — TRICANTHOS, Kansas. xxix, 447.
Globba JAPONICA, Japan. xxviii, 115.
Globularia ALYFUM, Algeria. xxvi, 278.
Globules (gelatin) of IODIDE POTASSIUM, Berg. xxviii, 63.
Globuli PEPTICI, Hager. xxviii, 63.
Gloriosa SUPERBA, India, descript. and uses, Warden. xxix, 125.
Glossocardia BOSVALLEA, India, descript., Dymock—G. LINEARIFOLIA, India. xxvii, 179.
Glucinium, See also BERYLLIUM.
 — xxvi, 388—prep., prop., Wilson and Petterson. xxvi, 388—fluorescence of salts, Soret. xxvii, 346.
 — PLATINO CHLORIDE, Welkow. xxiii, 281.
Glucose. See also GRAPE SUGAR.
 — yield of alcohol, Friedländer. xxiii, 338—often contains arsenic, Clouet. xxvi, 519; xxviii, 302—act. of baryta, Reichardt. xix, 257—estimat. in blood, Bernard. xxvi, 525, 6; Pavy. xxvi, 526—yield fr. cassava. xxx, 374—constitution, Franchimont. xxviii, 294; xxix, 519—compound with cupric oxide, Fileti. xxvii, 444; Salkowski. xxiii, 364; xxvii, 444—conversion into dextrin, Musculus and Meyer. xxx, 376—discussion. xxix, 519—gaseous products of the decomposition by electric current, Brown. xxi, 354—equivalent in copper, Degener. xxx, 376; Weil. xxi, 354; is variable, Soxhlet. xxvii, 444; Soxhlet refuted, Mercker. xxvii, 445—ESTIMAT.: Gratama (Mulder unreliable). xxvii, 446; Hager (acet. mercury, chlor. sod.) xxvi, 523; Heinrich (Sachse modified) xxvii, 446; Knapp (cyan. mercury). xviii, 269; xix, 256; Mercker (gravimetric). xxvii, 445; Mulder (alkal. copper). xxvii, 445; Pavy (Fehling with ammon.) xxix, 310; Sachse (alkalies, iodohydr. pot.) xxv, 288; xxvii, 446—act. of metallic ferrocyanides, Bong. xxvi, 369—fr. glycerin, Kosmann; (based on a mistake, Liebermann.) xxvi, 498—identity as obtained fr. diff. sources, Hesse. xxviii, 301—manufact. and uses. xxviii, 300; Ebert. xxix, 519; Joy. xix, 256; Valentin. xxvi, 518; Wiley. xxx, 373—does not pre-exist in wheat or rye flour, Pöchl. xxiii, 126—chemically pure, Neubauer. xxiv, 317; Schwarz (cane-sugar in alc. and mur. ac.) xxi, 354—as reducing agent, Böttger. xxviii, 301—reducing power for Fehling's sol., Degener. xxx, 376; Soxhlet. xxvii, 444; Weil. xxi, 354; Mercker. xxvii, 445—in sphero-crystalline form in drugs, Braun. xxvii, 443—fr. starch by carbonic ac., Bachet and Savalle. xxvii, 440—distinct. react. fr. cane-sugar, Campanini. xxii, 248; Classen. xxiii, 364; Gawalowski. xxvi, 521—as substit. for cane-sugar in pharm. prep., Allaire. xxix, 405—cause of sulphurous odor, Ebert. xxix, 520—sulphurous ac. prevents decomp., Ebert. xxix, 520—TESTS: Brücke (modif. of Böttger).

Glucose (Continued).

xxv, 287; Dudley (Böttger modif.) xxviii, 301; xxx, 376; Hager (test solutions). xxvi, 527; Knapp (cy. merc.) xxv, 288; Lagrange (Fehling, with tartr. copper). xxiv, 316; Lindo (nitr. ac. and brucia). xxvii, 446; Maschke (tungstate sod.) xxvi, 524; Mazzara (chlor. nickel) xxvi, 528; Pavy (cupric pellets). xxviii, 302; Pellet. (sul. cop., chlor. sod., carb. sod., chlor. am.) xxvi, 527; Pollaci (ferric oxide). xxvi, 528; Power (am. sulph. cop.) xxv, 287; Sachse (iod. merc., iod. pot.) xxvi, 527; Soldaini (carb. cop., carb. sod.) xxv, 287—a normal constituent of urine of old persons, Hager. xxvi, 633; separated fr. urine by chlorof., Caillan. xxvii, 547; detect. in urine, Campani (acet. cop. and lead). xxi, 355; (decolor. by charcoal). xxii, 248.
Glucosides, decomposit. by heat, Schiff. xxix, 350—test (sulph. ac. and bile not conclusive), Almquist. xxiii, 436.
Glue, prevent cracking and peeling (chloride calc.). xxiv, 112.
 — LIQUID (glue, india rubber, spir. nitr.). xxi, 127; (sacch. lime, gelat.) xxi, 196; (mur. ac., chlor. zinc). Knapp. xxiv, 112; (phosph. ammon.) xxiv, 112; (whisky). xxix, 59.
 — SOLUBILITY in glyc., Maisch. xix, 254.
 — WATERPROOF (bichrom.) xxi, 139; (tungstic ac.). xxi, 139.
 — in California. xxvii, 625.
 —, FISH, Astrakan (scales of carp). xxii, 172.
 — GERMAN. xxiv, 808.
 — GILBACKER (fr. Silurus Parkeri), Brit. Guiana. xxiv, 738.
 — MARINE (shellac, caoutchouc). xxi, 137.
Gluten, estimat. in flour; prep., Bénard and Girardin. xxx, 452.
Glycelæum, Groves. xxx, 85.
Glycerate, see GLYCERITE and GLYCEROLE.
Glycerin fr. glycerin, Reichl. xxx, 357.
Glyceria FLUITANS, ergot, Wilson. xxiv, 120.
Glycerides. xxx, 358, 9.
Glycerin assay, Champion, Pellet. xxiv, 299—assay in beer, Clausen. xxix, 302—in dyeing with anilin colors. xxi, 344—boiling point. xxiii, 354—act. on borax. xxvi, 498—compound with boric ac., Barff. xxx, 358—for burrs, Koller. xxviii, 286—detect. of butyric ac., Perutz. xix, 255—retards chemical act., Lange. xxvi, 497—insoluble in chlorof. (only miscible), Draper. xviii, 252—commercial examined, Remington. xviii, 187; xix, 255, 539; Cheatham. xxiv, 300; discussion. xviii, 7—crystallized, Henninger; Roos. xxiv, 300; does not ferment with yeast, Roos. xxiv, 300—drug market. xx, 122; xxi, 447; xxii, 625; xxiv, 396; xxv, 341; xxvii, 560, 567; xxviii, 372; xxix, 373; xxx, 466—English is better than most Continental, Smith. xxi, 343, 493—estimated as nitroglycerin, Champion and Pellet. xxiv, 300—ferments, not with alcohol, but with schizomycetes and chalk, Fitz. xxv, 279—freezing point of aqueous. Bullock. xxi, 445—converted into glucose, Kosmann; (based on a mistake, Liebermann.) xxvi, 498—history in U. S., Shoemaker. xxvii, 418—hygroscopicity, Kennedy. xxvi, 881; xxvii, 724; Williams. xxix, 302; Wilmott. xxvii, 82—in hypodermic inject., Paul. xxii, 240—irritating prop. xix, 87—manufacture fr. spent lyes, Fleming. xxx, 355; fr. soapmaker's waste, Farrell. xxx, 355—table of per cent., Champion and Pellet. xxii, 240; Lenz. xxix, 301; Schweikert. xxi, 343—its proper place in percolation, Squibb. xxvi, 213—in pharmacy, Biddle. xxvi, 497; Gordon. xix, 439—as anatomical preserving fluid, Köllner. xviii, 251; xix, 255—purified, Castelharz. xxiii, 355—what is "sufficiently pure?" Mason. xxi, 493—test for purity, Godfrey. xxiii, 354; Pellet. xxii, 239; xxiv, 298; see COMMERCIAL—Sarg's leaves a violet-bluish film, Rice. xxi, 494—act. of bicarbon. sodium. xxvi, 498—as solvent, Klever. xviii, 252; Farten. xxviii, 285—sp. gr., see PER CENT. TABLE—in tanning. xxi, 344—test: (liberat. of boric ac. fr. borax), Senior and Lowe. xxvii, 419; (phenol, sulph. ac., ammon.), Donath and Mayrhofer. xxx, 365, 7—modifies therapeut.

Glycerin (*Continued*).

- act. of medicine, Parrish. xix, 106—volatility, Couttalence. xxx, 355; Hager. xxv, 280; Squibb. xxvi, 717; volat. doubted, Lord. xxvii, 419—estimat. in wines, Bergmann. xxx, 356; in plastered wines (hydrofluo-silicic ac.), Reynaud. xxviii, 285.
- PLUMBATE (mono, penta-, sesqui-,) Morawski. xxx, 359.
- SOLIDIFIED (soap). xxi, 143—Price's analyzed. xix, 159.
- DROPPER, Wharton. xxiv, 89.
- IODIZED (with iodized oil bitter almonds), Blackwell. xxvii, 82.
- JELLY (soap) xxi, 143.
- LEMONADE, Schulze. xxi, 171.
- PUTTY. xxx, 359.
- SOAP, Heren. xviii, 212.

Glycerinum CINCHONÆ, Anderson. xxvi, 109; see GLYCEROLE.

Glycerite. See also GLYCEROLE.

- BORIC ACID, Dana, Jr. xxx, 555.
- BISMUTH, Bateau. xxv, 82; xxx, 84. See GLYCEROLE.
- CHLORAL and CAMPHOR, Fairthorne. xxiii, 67.
- CHLORAL and MORPHIA, Fairthorne. xxiii, 67.
- CHLORAL and VERATRIA, Fairthorne. xxiii, 67.
- GINGER, Moore. xxi, 171.
- IRON OXIDE, Hoffmann. xxiii, 67.
- IRON SUBSULPHAS, Sayre. xxviii, 67.
- LIME, Cailes. xxv, 80; Laub. xxv, 80.
- LITMUS (is stable), Fairthorne. xxiii, 67.
- OL. RICINI, Phil. Hosp. xxiv, 77.
- PHOSPHORUS, Menière. xxvi, 110—Urwick. xxvi, 110.
- STARCH (285° F.), Lloyd. xxviii, 56. See also PLASMA.
- TAR, revision U. S. Ph. xxvii, 675—Lloyd. xxviii, 57. See GLYCEROLE.
- THUJA OCCIDENTALIS, Lawes. xxvi, 110.
- THYMOL. xxix, 73—Busnier. xxx, 84.
- ZINC, HYPOPHOSPHITE, Polk. xxvii, 83.

Glycerole. See also GLYCERITE.

- recommended as substit. for syrups, Guichard. xxii, 74.
- ASAFETIDA, Robbins. xxi, 171.
- BISMUTH, NITRATE, Moorehead. xxv, 81—Squire. xxv, 80—Williams. xxv, 80, 81—Willmott. xxv, 82. See GLYCERITE.
- CINCHONA, Loos, Jr. xxix, 73. See GLYCERINUM CINCHONÆ.
- CINCHONA AROMAT., Loos, Jr. xxix, 73.
- GALLIC ACID (by too high a heat pyrogallac ac. is formed), Thorpe. xxx, 84.
- HYPOPHOSPHITES (lime, soda, pot.), Zoeller. xxx, 118.
- LEAD, SUBACETATE, Squire. xxiv, 77.
- LICORICE, AROMATIC, Loos, Jr. xxix, 73.
- LIME, SACCHARATED, Latour. xxii, 74—Phar. Soc. Paris. xxv, 80.
- MEAT, Volkmar. xxiv, 78.
- MYRRH and BORAX, Fairthorne. xxx, 84.
- PEPSIN and SALICIN, Postans. xxv, 82.
- ROSAT. LENIENS (tragac., borax, glycerin), Hager. xxiii, 67.
- SALICIN, Postans. xxv, 82.
- TAR, Peyronnet. xxiv, 77. See GLYCERITE.

Glycocoll, act. of ammoniacal copper, Læw. xxvii, 356—color reactions, Engel. xxiii, 475.

Glycogen, act. of anhydr. acet. ac., Schützenberger. xix, 261—source of glucose in blood, Bernard. xxi, 352.

Glycol and oxalic ac. yield formic ac., Lorin. xxii, 250—prep., Zeller, Hüftner. xxiv, 301.

Glycolide, prep. Norton and Tscherniak. xxvii, 453.

Glyconin. xxiii, 79—uses. xix, 489—Squibb. xxiv, 477.

—“WHITE” (with white of egg), Close. xix, 490.

Glycyrrhiza GLABRA, germination of seed, Saunders. xxx, 567.

—See also LICORICE, EXTRACT and ROOT.

Glycyrrhetin, Habermann. xxix, 352—act. of potassa, Weselsky and Benedikt. xxv, 316.

Glycyrrhizin, history, Remington. xxvi, 756—existence in the root, Seelini. xxviii, 345—alcohol. fermentat., Griessmayer. xxiii, 339—constitu-

Glycyrrhizin (*Continued*).

tion, Habermann. xxvi, 612; xxvii, 525; xxix, 351—preparation, Hirsch. xviii, 133; xix, 275; discussion. xxvi, 891.

—AMMONIACAL, Appenzeller. xxvi, 613; Arthur. xxiv, 372; Comerade. xxix, 352; Habermann. xxix, 352; Rittenhouse. xxiv, 543; Roussin. xxiv, 371.

—BITTER;—RESIN, Habermann. xxix, 352.

Gnaphalium CALIFORNICUM, Calif. xix, 303;—G. CANESCENS, Mexico. xxiv, 774;—G. MACROCEPHALUM, Calif. xxvi, 638; xxvii, 611;—G. POLYCEPHALUM, Kansas. xxix, 442;—G. SPRENGELII, Calif. xix, 303.

Gnoscopia, fr. opium, T. & H. Smith. xxvii, 487.

Goa powder, drug market. xxv, 352; xxvi, 661; xxviii, 372—contains chrysarobin and not chrysophanic ac., Liebermann and Seidler. xxvii, 474.

—See also ARAKABA and ACID, CHRYSOPHANIC.

Goagari-lakri—Strychnos colubrina, India. xxviii, 1, 6.

Goaguree—Strychnos nux vomica, India. xxv, 150.

Goat's rue—Leprosia virginica, Kansas. xxix, 447.

Gobernador—Larrea mexicana, California. xxvii, 6, 8.

Gobernadora—Zygophyllum tabago, Mexico. xxiv, 777.

Gobo—see Arctium Lappa, Japan. xxviii, 145.

Gockroo—Tribulus lanuginosus, India. xxiv, 725.

Goga Bayogo—Mimosa scandens, Manila. xxiv, 767.

Gold. xix, 210; xxi, 317; xxiv, 266; xxvi, 424; xxviii, 254; xxx, 310; in California. xxvii, 288.

—act. of trimethylamin on salts, Vincent. xxv, 316—estimat., Darion (traces by iod., iod. pot.). xxx, 310; in antimony, Gawelowski. xxvi, 424—dissolves in dil. sulph. ac. when used as positive pole, Berthelot. xxviii, 254—extracted fr. pyrites by bromine, Wagner. xxiv, 218—reduced by chloral. xix, 246—oxidized by oxacids, Pratt. xix, 210—test (sulphocy. pot.), Kern. xxiv, 266.

—LACQUERS. xix, 174.

—ARSENATE. xxvi, 425.

—ARSENIDE, Deschamps. xxvii, 366.

—CHLORIDE, reduced by magnesium. xix, 205—prep. of proto-, Leuchs. xxi, 317.

—CHLORIDE, (new) not decomposed by heat, Debray. xix, 210.

—and IRON SULPHOCYANIDE, Skey. xxiii, 267.

—OXIDE, temp. of reduct. by hydrogen, Müller. xix, 134.

—and SODIUM CHLORIDE (prel. prep. of pure gold avoided), Solthien. xxx, 311.

Gold Coast products, Centen. exhibit. xxiv, 741.

Golden Alexanders—Thapsium aureum, Kansas. xxix, 452.

Golden rod—Solidago odora, Indian remedy. xxi, 619;—G. HARD LEAVED—Solidago rigida;—G. SMOOTH THREE-RIBBED = S. gigantea, Kansas. xxix, 443.

Golden seal, see HYDRASTIS.

Golendrina—Euphorbia polycarpa, Mexico. xxvii, 266.

Goma MEZQUITINA, Mexico. xxiii, 649. See also MEZQUITE GUM.

—de SONORA, shellac fr. Mexico (Acacia Gregii; Larrea mexicana?), cont. sarkosinic ac., Herz. xxiv, 203.

—TOME-SAÔ = Rehmannia lutea, Japan. xxviii, 205.

Gombin fr. Hibiscus esculentus. xxiii, 192.

Gome—see Schizandra nigra, Japan. xxviii, 166.

Gomichi—Schizandra chinensis. xxviii, 167.

Gonsurong—Croton oblongifolia, India. xxviii, 193.

Good, J. M. xxvii, 797, 803—xxx, 634, 646, 664.

Gooseberry leaves, per cent. of ash. xxii, 137.

Gootee—Smilax ovalifolia, India. xxv, 125.

Gordolobo—Gnaphalium canescens, Mexico. xxiv, 774.

Gordon, W. J. W. Glycerin in pharm. prep. xix, 439.

—discussions: xix, 33, 107, 110, 111; xx, 55, 68, 69, 99, 101, 102; xxviii, 562, 569, 570, 574; xxx, 632, 633, 635, 636, 643.

- Goree neem = *Melia azadirachta*, India. xxvi, 165.
- Gorskia = spec. of *Copaifera*, Africa. xxv, 216.
- Goruck chentz = *Adansonia digitata*, India. xxv, 182.
- Goshetam (-tamu) = *Aplotaxis auriculata*, India. xxvi, 225.
- Go-siu-ju = *Evodia rutæcarpa*, Japan. xxviii, 168.
- Gossypium HÆMOSTATICUM, Dutch Pharm. Soc. xxx, 129.
- see also COTTON.
- HERBACBUM, see COTTONROOT BARK.
- Göttinger Kindermehl, analysis, Müller. xxiv, 110.
- Gouania DOMINGENSIS. xxvii, 281, 2.
- Goudron DE CADE = Juniper tar;—DE NORVÈGE = wood tar;—"TAR" = wood tar;—VÉGÉTAL = wood tar, France. xxvi, 325.
- Gourliea DECORTICANS, Arg. Republ. xxx, 138.
- Gouve = *Pinus cembra*, France. xxvi, 322.
- Gracilaria LICHENOIDES, yields Ceylon moss, India. xxiv, 725.
- Graduates, hard to verify, Pile. xxi, 574—(conical worthless, tumbler best), Sharples. xxiv, 459—discussion. xxiv, 681—Hodgson's and Hobbs about the best, Pile. xxi, 573; xxiv, 681.
- HODGSON'S. xxi, 573; xxiv, 681.
- Grahame, I. J. xxv, 549.
- Grain (weight) to be exactly one-fifteenth of one gramme, Elliott. xxi, 579.
- Grains, determinat. of moisture. xxvii, 136—saccharification (sulphurous ac.) Hénilion; Melnikoff. xxvi, 517.
- of PARADISE, acidity due to paradisol, Buchheim. xxii, 34, 101.
- Graminaceae. xxi, 205; xxii, 99; xxiii, 127; xxiv, 121; xxv, 122; xxvi, 180; xxvii, 136; xxviii, 103; xxix, 120; xxx, 147; of California. xix, 307; Kansas. xxix, 445; Mexico. xxiv, 769.
- Granilla BLANCA = *Triticum repens*, Arg. Republ. xxiv, 764.
- Granular EFFERVESCENT SALTS, examin. of commercial. xxii, 371—prep., Mattison. xxii, 368; xxiii, 91—discussion. xxii, 523.
- LITHIUM CARBON. Phar. Soc. Paris. xxvi, 134.
- MAGNESIUM CITRATE, Mattison. xxiii, 487.
- SODIUM TARTRATE, Hayhurst. xxiv, 96.
- VICHY, Mattison. xxiii, 488.
- See also EFFERVESCENT.
- Granulose, Nægeli. xxiii, 359.
- Grapes, culture, Greece, Landerer. xxv, 187—coloring matter, Andrée. xxviii, 353—unripe cont. succinic ac., Brunner and Brandenburg. xxv, 295—process of ripening, Saint Pierre. xxvi, 259—curious results of transplanting, Landerer. xxv, 187.
- JUICE, act. of iodic ac., starch; sulphomolybdic ac., Brown. xxvii, 485, 6—in Greece. xxiv, 170.
- SUGAR, (crystallized) constitut., Halse and Steiner. xxix, 519—anhydrous cryst., Behr. xxx, 375. See also GLUCOSE.
- Graphites, California. xxvii, 591.
- Grass, BLUE-EYED = *Sisyrinchium bermudicum*;—G., BROME-, = *Bromus ciliatus*, Kansas. xxix, 445, 6;—G., BUNCH-, = *Testuca scabrella*, Calif. xxvii, 605;—G., CHESS-, = *Bromus secalinus*, Kansas. xxix, 445;—G., FRENCH RUG-, = *Arrhenatherum avenaceum*, Calif. xxvii, 604;—G., GOLDEN, China. xxiv, 744, 748;—G., OAT-, = *Arrhenatherum avenaceum*;—G., PIN-, = *Erodium cicutarium*;—G., SPIKE-, = *Bryzopyrum spicatum*;—G., SQUIRREL-, = *Atropis Californica*;—G., SWAMP-, = *Helenium puberulum*, California. xxvii, 604, 5.
- Grasses, California. xxvii, 604.
- Grass tree = Acaroid tree, Australia. xxx, 148.
- Grassly, Chas. W. Discussion. xxi, 67—expulsion. xxi, 70—letter of resignation. xxi, 68—Seidlitz powders, examined. xx, 273.
- Gratiola OFFICINALIS, Turkestan. xxi, 214.
- Gravel cured by *Polygonum aviculare*, Jackson. xxii, 102.
- Gravimeter, sp. gr. of powders (measuring liquid displaced) Mann. xxvi, 47.
- Great Britain, chemicals, Centen. Exhibit. xxiv, 10
- Great Britain (Continued.)
- 784—pharmaceut. legislation. xix, 315—pharm. prep., Centen. Exhibit. xxiv, 805—pharmacy. xxii, 30.
- Green, ANILIN, Lauth and Baubigny. xxii, 275.
- fr. COFFEE, Zech. xxviii, 352.
- MOSELLE, Stein. xxvi, 266.
- SCHWEINFURTH, safely subst. by manganate barium, Fleischer. xxiii, 288.
- THALLIUM, Salter. xxvi, 423.
- Gregory, E. Emulsions. xxiv, 485—emulsion mortar. xxv, 412.
- discussions. xxiii, 824; xxv, 520, 546, 557, 558, 564; xxx, 618, 620, 647, 648.
- Grieve, F. G. xviii, 47.
- Griffith, H. E. Address of welcome at Niagara. xxx, 582—emulsion, cod-liver oil and hypophosphites. xxix, 429.
- Grindelia SQUARROSA, California. xxvi, 698; xxvii, 610—Kansas. xxix, 442.
- HIRSUTULA, Calif. xix, 302—in eruption of poison oak, Canfield. xxi, 225; xxix, 226.
- INTEGRIFOLIA, Calif. xxvi, 698.
- ROBUSTA, California. xix, 302; xxvi, 698; xxvii, 610—account, Steele. xxiii, 637—drug market. xxv, 352; xxvi, 661; xxviii, 372—in erupt. of poison oak, Canfield. xxi, 225.
- Grindelia of California. xxvii, 609.
- Grislea TOMENTOSA, India. xxiv, 718.
- Grossulaceae of California. xix, 301.
- Ground cherry = *Physalis viscosa*, Kansas. xxix, 451.
- nut = *Apios tuberosa*, Kansas. xxix, 447.
- nut, see ARACHIS HYPOGÆA.
- plum = *Astragalus caryocarpus*, Kansas. xxix, 447.
- Groundsel = *Senecio aureus*, use by Indians. xxi, 620.
- Grummet, of rubber tubing, Squibb. xxi, 540.
- Guaco = *Aristolochia grandiflora*, Mexico. xxiv, 771. See also MIKANIA GUACO.
- Guaiac PAPER, act. of ammonia, Greiner. xix, 200.
- RESIN, adult. of powd. xxx, 576; xxii, 132; xxiii, 510—behavior to reagents, Hirschsohn. xxvi, 453—9—cause of blue color, Schaer. xxi, 233—emulsifying (milk sug., alc., acac.), Greenish. xxv, 92—in clear mixture (tinct., glyc.), Squire. xxvii, 95; (alkaline solut.), Shinn. xix, 148—powdering (sugar milk), Bibby. xxiv, 96—liquid preparations (potassa), Shinn. xviii, 148—sp. gr., Hager. xxvii, 424.
- wood, adult. xxi, 480—cont. seldom any resin, Schutz. xxii, 132.
- Guaiacol, quite similar prop. with creasote, Williams. xxi, 341.
- Guaiacum PERUVIANUM AROMATICUM, examin., Kopp. xxv, 174.
- Guaiana, British, drugs at Centen. exhibit. xxiv, 738.
- Guajiote = resin of *Rhus perniciosa*, Mexico. xxiv, 768.
- Guano, for production of caffein and theobromin, Fischer. xxx, 431.
- Guarana, mineral adult. of powd. detect. by chlorof., Siebold. xxviii, 278—adult., xxx, 576—yield of caffein. xxi, 239; Feemster. xxx, 569—drug market. xxii, 625; xxv, 354; xxviii, 372; xxix, 373; xxx, 467—prop., xix, 267—preparations, Kennedy. xxiv, 491—menstruum. xxvi, 900—its tannic acid, Greene. xxvi, 269.
- Guarana, Williams. xxiii, 426.
- Guacuru, Arg. Republ. xxiv, 764;— = *Plegorrhiza astringens*, Chili. xxvii, 155, 6;— = *Statice brasiliensis*, Brazil. xxvii, 155.
- Guayeru = *Chrysobalanus icaco*, Brazil. xxvii, 155.
- Guelder Rose = *Viburnum opulus*, account, Maisch. xxvi, 242.
- Gugal = gum resin fr. *Boswellia serrata*, India. xxv, 218.
- Gugal (GUGUL, GUGUR) = resin fr. *Balsamodendron mukul*, India. xxiv, 195.
- Guitau, F. R. On the American opium swindle. xxii, 554, 5.
- Guizotia OLEIFERA, India. xxiv, 722—descript., Dymock. xxvii, 179.
- Gujar = *Sarcocolla* plant, India. xxvii, 249.
- Gujkarnee = *Rhinacanthus communis*, India. xxv, 141.

- Gulanche** = *Tinospora cordifolia*, India. xxiv, 724.
- Gul hamah** = purple dye fr. *Nyctanthes arbor tristis*, India. xxviii, 126.
- Gulhamaz** = fruit of *Rumex vesicarius*, India. xxviii, 118.
- Gul-i-banafsha** = flowers of a spec. of violet, India, Dymock. xxvi, 162.
- Gul-i-ghafith**, India, descript., Dymock. xxviii, 133.
- Gul-i-pista** = galls of *Pistacia*, India. xxvi, 163.
- Gul-i-turah** = *Poinciana pulcherrima*, India. xxvi, 166.
- Gul-riohr** = *Poinciana pulcherrima*, India. xxvi, 166.
- Gulli chairu** = *Althaea ficifolia*, Turkestan. xxi, 234.
- Gum ACAROIDES** fr. *Xanthorrhoea* spec. xxix, 127, 373.
- ARABIC, act. of anhydr. acet. ac., Schützenberger. xix, 261; of metallic ferricy., Bong. xxvi, 369—adult. of powd. (wheat flour) xxi, 480, 486; (sand, marble dust). xix, 334; xxx, 576—detect. of mineral adult. (chloroi.) Siebold. xxviii, 278—comparat. examin. of ten Indian varieties, Masing. xxix, 212, 3—distinct. fr. dextrin, Hager. xix, 274; xxii, 153; Mussat. xxiii, 500—for dispensing (with glyc.), Shryock. xxiv, 82—drug market. xix, 403; xx, 122; xxi, 436; xxii, 625; xxiv, 396; xxv, 348; xxvi, 635; xxx, 467—loss in drying. xxiii, 596—format. at the expense of the crude sap, Corre. xxv, 212—yields iodoform, Hager. xxx, 346—in solut. is convert. into glucose and dextrin by metallic iron, Kosmann. xxvi, 519—color react. with orcin and acid, Reichel. xxviii, 298—powder should not be too fine, nor dried over 86° F., Hager. xxii, 153—purificat. (precip. mucil. with alc.) Vogel. xxvi, 512.
- ARABIC fr. INDIA. xxiv, 191, 2.
- BASSORAH, examin., Masing. xxix, 214.
- BANHINIA, Queensland. xxiv, 741.
- BULLY TREE = Balata. xxx, 186.
- CHICLE = Balata. xxx, 186.
- EUCALYPTUS, Queensland. xxiv, 740, 1.
- KAURI, oil, constitut., Muir; Rennie. xxx, 324.
- KUTERA, examin., Masing. xxix, 214.
- HOG = fr. *Rhus metopium*. xxix, 225—account, Mitchell. xxviii, 298.
- LAC OF THE GROUND = Acaroid, Australia. xxx, 148.
- MORETON BAY ASH, Queensland. xxiv, 741.
- RESINS, disting. tests, Hirschsohn. xxvi, 449, 459—in powder (sugar of milk), Bibby. xxiv, 96—purified (alcoh.), Dieterich. xxvii, 396; (oil turp., alc.), Jungelmann. xxvii, 396.
- SAVAKIN, Reimann. xxix, 212.
- SENEGAL, collect. in Senegambia, Féraud. xxii, 154—Corre. xxv, 212.
- SPOTTED, fr. *Eucalyptus maculata*, Queensland. xxiv, 741.
- SPRUCE, fr. *Abies nigra* and not fr. *Abies canadensis*, Patch xxx, 252.
- THUS = galipot. xxvi, 324.
- TUNO = Balata. xxx, 186.
- YELLOW = Acaroid. xxx, 148.
- E. INDIA, Centen. exhibit. xxiv, 718.
- MEXICO, Centen. exhibit. xxiv, 767.
- Gumbo**, see *HIBISCUS ESCULENTUS*.
- Gummi FLAVUM** = Acaroid. xxx, 148.
- RESINA LUTEA = Acaroid. xxx, 148.
- Gums**. See also under their RESPECTIVE NAMES.
- plant = *Eriodictyon californicum*. xxvi, 698.
- Gun-cotton**. See also COLLODION COTTON.
- act of sulphuric ac., Gintl. xviii, 270—constitution, Gintl. xviii, 261; (is not a nitro-compd. but a derivat. of nitr. ac.), Eder. xxviii, 296—reconverted into cellulose by stannite of sodium, Boettger. xxiii, 358; (this react. serves to detect unnitrated cotton)—explodes by camphor vapor, Seeley. xix, 261—saturated with benzole, ether, etc., etc., “melts” away on burning, Bleckrode. xxi, 351—preparation: Boettger, (wash first after several days). xxix, 307; Mitchell (equal quantities nitr. and sulph. ac.). xxi, 149; (fr. cotton pulp). xxi, 146—soluble in
- Gun-cotton**. (Continued.)
- acetone, methyl. alc., glac. acet. ac., Baron; in stannite sodium, Boettger. xxi, 350.
- PULVERULENT (add gelatin to acid mixt. before nitrating cotton), Wolfram. xxvii, 438.
- Gunja**, account. xxi, 261.
- Gunnera SCLARA**, Chili. xxiv, 766.
- Gunpowder**, AMMONIA. xix, 169.
- Guren** = *Ammania vesicatoria*, India. xxvii, 237.
- Gurh**—molasses, India. xxiv, 715.
- Gurjun**. See BALS. GURJUN.
- Gutta percha**, purif. (bisulph. carb., alc.), Willmarth. xxiv, 201; (benzin, gyps., alc.) xxix, 154—cemented to silk and leather. xix, 172, 3—is not sol. in eucalyptus oil, Osborne. xxvii, 234—solution (bisulph. carb., turp.). xxii, 86—statistics. xix, 286—pure, white. xix, 286.
- shea, fr. shea butter, Henderson. xxvii, 432.
- Guttiferæ**. xxv, 183; xxvii, 209.
- Gydia gum**, Queensland. xxiv, 741.
- Gymnea SYLVESTRIS**, India, (chewing destroys taste of sugar), descript., Dymock. xxv, 151.
- Gymnocladus CANADENSIS**, Kansas. xxix, 447.
- Gynandropsis PENTAPHYLLA**, India, descript., Dymock. xxv, 195—Kansas. xxix, 441.
- Gynocardia**. See CHAULMOOGRA and OIL CHAULMOOGRA.
- Gypsum** sets best with 20 p. c. water, Landrin. xxiii, 278—“dead” sets with sulphate potassium, Schott. xix, 204.

H.

- Habite kobura** = *Evodia rutæcarpa*, Japan. xxviii, 168.
- Hab-ul-balesan** (Arabic) = berries of *Balsamodendron opobalsamum*, India. xxvi, 160.
- Hab-ul-fakad** (Arabic) = a spec. of *Vitex*, descript., Dymock. xxviii, 126.
- Hachisu** = *Nelumbium speciosum*, Japan. xxviii, 115.
- Hackberry** = *Celtis occidentalis*, Kansas. xxix, 452.
- Hæmatin**, Struve. xxi, 399—fr. blood by tannin, Struve. xxi, 399.
- Hæmatoidin** (of Stædeler) identical with lutein (of Thudichum). xix, 235—fr. blood, Struve. xxi, 399.
- Hæmatosin**, Tabourin. xix, 236.
- Hæmatoxylin**, decomp. products on dry distill., Meyer. xxviii, 352—as test for alkalies and acids, Maschke. xxiii, 458.
- phthalein-, Letts. xxviii, 353.
- Hæmatoxylon**. See LOGWOOD.
- CAMPICHIANUM, Mauritius. xxiv, 741.
- Hæmin CRYSTALS** (by iod. pot.) Helwig. xxi, 399.
- Hæmodoracæ**, Kansas. xxix, 445.
- Hæmopsis SANGUISUGA**. xxiii, 231.
- Hæmorrhage PLANT** = *Aspilia latifolia*, Liberia. xxvi, 168.
- Hæmostatic**, Pavesi. xxviii, 88.
- Hagenia ABYSSINICA**. xxiii, 210. See also KOUSSO.
- Hair DYE**, black, (Turkish) Valta. xxx, 136.
- light brown, Bernbeck. xxviii, 96—McDonald. xviii, 212.
- harmless, Hager. xxi, 200.
- OIL, with oil mustard seed, Rother. xxiv, 65.
- RESTORATIVE, Wilson. xxiv, 152.
- Haji-mo-ki** = *Rhus succedanea*, Japan. xxiv, 193.
- Hakka** = *Mentha austriaca*, Japan. xxviii, 127.
- Hak-tau-au** = *Anemone cernua*, Japan. xxviii, 163.
- Hak-too-woo** = *Anemone cernua*, China. xxviii, 164.
- Halidrys SILIQUOSA**, yield of kelp and iodine. xxvii, 133, 4.
- Halilei sie** (SART) = *Terminalia chebula*, Turkestan. xxi, 245.
- Halilek-i-Hindi** (-1-KABULI) = *Myrobalanus chebula*, India. xxvii, 232.
- Hallberg**, C. S. Powd. extract. xxix, 424—saccharated extracts. xxvii, 715—milk sugar. xxix, 510.
- Hallymetry**, Fuchs; Diehl. xxvii, 400, note.
- Hamelia VENTRICOSA**, West Indies. xxiv, 152.
- Hamlin's WIZARD OIL**, analyzed, Pierron. xxiv, 421.
- Hana-miyo-ga** = *Alpinia japonica*, Japan. xxviii, 115.

- Hanbury, D.* Exports of Virginia in 1610. xix, 79, 491—memorial fund. xxvi, 868.
- Hanchinol* = *Heimia salicifolia*, Mexico. xxiv, 777.
- Hancock, J. F.* Annual address. xxii, 478—inaugural address. xxi, 59—address to the pharmacists of Richmond, Va. xxi, 107—powd. blue mass. xxii, 374, 526, 7—cellar and store room. xxvi, 703—chlorodyne. xxiii, 610—cinnamon water. xxiv, 685—dispensing counter. xx, 192; xxiv, 456—elixirs. xxi, 91, 119; xxii, 560, 2, 3—unofficial formulas. xxi, 119—to keep Magendie's solution. xxi, 98—revision of the pharmacopœia. xxiv, 646—substitutions. xx, 83—suppositories. xxii, 502, 4—syrup iod. iron. xxiv, 665—syrup orange peel. xxi, 91.
- discussions. xx, 83, 85; xxi, 45, 59, 63, 64, 91, 98, 107; xxii, 465, 502, 504, 505, 516, 526, 527, 528, 533, 538, 540, 543, 554, 557, 560, 562, 563, 565, 572; xxiv, 575, 613, 623, 646, 647, 649, 664, 665, 669, 670, 685, 686, 687, 688.
- Han-ge* = *Pinellia tuberifera*, Japan. xxviii, 102.
- Haplopappus*, see also *APLOPAPPUS*.
- *BAILAHUEN*, Chili. xxiv, 765.
- Har* = fruit of *Terminalia chebula*, India. xxvii, 232.
- Hardwickia PINNATA*, India. xxiv, 173, 718; xxv, 216.
- Haritaki* = fruit of *Terminalia chebula*, India. xxvii, 232.
- Harkai* = *Ophioxylon serpentinum*, India. xxviii, 141.
- Harrison Bros. & Co.* (Philadelphia), statistics of manufacture. xxiv, 535.
- Harrisonia BENNETTII*, India. xxiv, 165.
- Harrop, J.*, herbs preserved. xix, 495—herb press. xx, 179.
- discussions: xix, 121, 123.
- Harsignar* = *Nyctanthes arbor tristis*, India. xxviii, 126.
- Hartall* = Orpiment, China. xxiv, 751.
- Harz, FICHTEN-*; — *H/, TANNEN-* = Burgundy pitch. xxvi, 323.
- Hashish* of Central Asia, account and analysis, Preobraschensky. xxv, 228.
- Hashishin*, active constit. of *Cannabis indica*, Gastinel-Bei. xxii, 160.
- Hassenkamp, F.* xxiv, 620.
- Hasu* = *Nelumbium speciosum*, Japan. xxviii, 115.
- Hatsis* = *Nelumbium speciosum*, Japan. xxviii, 115.
- Haviland, Hy.*, xviii, 54, 105.
- Hawthorn* leaves, per cent. of ash. xxii, 137.
- *Cratægus coccinea*; *C. oxyacantha*, Kansas. xxix, 450.
- Hay*, aroma is due to melilotin, not to cumarin, Phipson. xxiv, 282.
- Hays, David*, effect of salts upon solut. of salicyl. ac. xxv, 465.
- Hazel nuts*, contain no crystallized albuminoids, Ritthausen. xxx, 449.
- Headache weed* = *Hedyosmum nutans*, Jamaica. xxx, 208.
- Heartsease* = a spec. of *Polygonum*. xxvii, 147—*Polygonum persicaria*, Kansas. xxix, 449.
- Heat*, apparat. for intense (Bunsen modif.), Hempel. xxvi, 67—act. upon resins, gum resins and balsams, Hirschsohn. xxvi, 458.
- Heating STONEWARE* pans and stills (heavy paraffin oil bath), Coffey. xix, 138.
- Hectograph*. xxviii, 94, 5; xxix, 112.
- Hedeoma PULEGIOIDES*, Kansas. xxix, 446.
- Hedera HELIX*, active principle, Davies and Hutchinson. xxvi, 244—Harsten. xxiii, 177—cont. saponin. xxiii, 448.
- Hederin* is hederintannic ac., Harsten. xxiii, 177.
- Hediondilla*, Arg. Republ. xxiv, 765.
- Hedyosmum NUTANS*, Jamaica. xxx, 153—descript., Holmes. xxx, 208.
- Hedyotis UMBELLATA*, India. xxiv, 716.
- Hedysarum ALHAGI*, Greece. xxv, 140.
- species, China. xxiv, 756.
- Heh-fu-tze*, a spec. of aconite, China. xxix, 173.
- Heimia SALICIFOLIA*, Mexico. xxiv, 777.
- Heinitsh, Charles A.*, inaugural address. xxx, 602; rhubarb, if water extr. all active principles. xxii, 390—wine of tar. xxiv, 490.
- discussion: xx, 65; xxii, 540; xxv, 508; xxx, 616, 617, 619, 626, 638, 640, 648, 658, 659, 670.
- Hejurchei* = *Leonotis nepetæfolia*, India. xxviii, 127.
- Helenium AUTUMNALE*, Maisch. xx, 88, 235—constit., Koch. xxii, 117—Kansas. xxix, 442.
- *BOLANDERI*. xix, 303—*H. PUBERULUM*, California. xix, 303; xxvi, 608; xxvii, 604.
- *TENUIFOLIUM*, Maisch. xx, 88, 235.
- Helianthemum CORYMBOSUM*, analysis, Krull. xxiii, 204.
- Helianthin* = Methyl-orange. xxx, 443.
- Helianthus ANNUUS*, cultivat., analysis, yield of seed and oil, Wittstein. xxiv, 143—oleoresin, Chardon. xxii, 116.
- *LENTICULARIS*, California. xxvii, 178.
- *ORGYALIS*, Kansas. xxix, 442.
- *PETIOLARIS*, California. xxvii, 178.
- *TUBEROSUS*, carbo-hydrates present in tubers, Dieck and Tollens. xxviii, 146—Kansas. xxix, 442.
- Helichrysum IMBRICATUM*; — *H. SERPYLLIFOLIUM*; — *H. NUDIFLORUM*, So. Africa, Jackson. xxii, 119.
- Helicin*, amorphous, Schiff. xxix, 351—act. of heat, Schiff. xxix, 350—synthesis fr. acetochlorhydrose, Michael. xxviii, 344.
- Helicteris ISORA*, India, descript. of fruit., Dymock. xxvi, 165—in Turkestan. xxi, 235.
- Heliochrysos* = *Chrysanthemum segetum*, Greece. xxv, 157.
- Heliopectis THEIVORA*, attacks cinchona in Java. xxvi, 236.
- Heliotrope*, cultivat. in Australia. xxviii, 100.
- Heliotropina*, Battandier. xxv, 143; xxvi, 211.
- artificial, cryst. xxx, 444.
- Heliotropium CURASSAVICUM*. xxv, 144—California. xix, 304.
- *EUROPÆUM*, analysis, Battandier. xxv, 143; xxvi, 210.
- *INDICUM*, Liberia. xxvii, 165.
- *PERUVIANUM*, analysis, Battandier. xxv, 144.
- *SUPINUM*. xxv, 144.
- Hellebore, BLACK*, recognition (mur. ac.) Herlandt. xxx, 148—adult. of powd. xxx, 576—drug market. xix, 395; xxv, 350.
- *GREEN*, recognition (mur. ac.) Herlandt. xxx, 148.
- Helleborein*. xxviii, 162.
- Helleborin*. xxviii, 162—(Husemann's) probably related to adonidin of Cervello. xxx, 444.
- Helonias DIOICA* substituted by *Liatris spicata*. xxiii, 501. See also *CHAMÆLIRIUM LUTEUM*.
- Helxine* = *Parietaria officinalis*, Greece. xxv, 122.
- Hematin* (fr. logwood) decolorized by iodine, Frébault. xxviii, 224.
- Hemerocallis GRAMINEA*, China. xxiv, 744.
- Hemi-albuminose* (of Kuhne). xxviii, 366.
- Hemizonia CORYMBOSA*; — *H. LUZULÆFOLIA*, California. xxvii, 612—*H. TRUNCATA*, California. xxvi, 998; xxvii, 612.
- Hemlock BARK*, adult. of powd. xxx, 576.
- *SMALL* = *Æthusa cynapium*, Kansas. xxix, 452.
- See *CONIUM*.
- Hemp seed* contains crystallized albuminoids, Ritthausen. xxx, 449—drug market. xxiv, 395; xxv, 351; xxvi, 660; xxvii, 560, 7; xxx, 467.
- Hemp, INDIAN*. See *CANNABIS INDICA*.
- *INDIAN, BLACK*, adult. of powd. xxx, 576.
- *DECKANEH*, fr. *Hibiscus cannabinus*. xxiii, 192.
- Henbane*. See *HYOSCYAMUS*.
- Henna*, account. xxiii, 209—*Lawsonia alba*. xxvii, 238; xxix, 207.
- See also *LAWSONIA*.
- Hepten* fr. rosin, Renard. xxix, 287.
- *HEXABROMIDE*, Renard. xxix, 287.
- Heracleum GIGANTUM*, analysis, Gutzeit. xxviii, 160—fruit, not quite ripe, cont. excess of ethylic alcohol, the ripe fruit, excess of methyl. alc., Gutzeit. xxiv, 287.
- *SPONDYLIIUM*, constituents of oil, Zincke. xviii, 287.
- Heraclin*, fr. *Heracleum* and *Pastinaca*, Gutzeit. xxviii, 160.
- Herapatite*, priority belongs to Bouchardat, Vrij. xxx, 414.
- Herbal* (Salmon's) *ENGLISH*. xxvi, 843.
- Herbaria* insects destroyed by bisulph. carb., Schnetzler. xxv, 251.

- Herbarium vivum medicinale**, Dr. Sommer. xxvi, 271.
- Herbs, PRESERVED**, discussion. xix, 121—Harrop. xix, 495—tin can, chlorof., sealed with beeswax, Lloyd. xxiv, 115—dried till friable, pressed warm, Schneider. xxvii, 119.
- improvement in **PACKING**, Miller. xxiii, 572; xxiv, 115.
- **PRESS**, Harrop. xx, 179.
- Herba MÆONIS ALBA** and **RUBRA** = *Phyllanthus niruri* and *urinaria*, India. xxviii, 195.
- Hermodactylus** = a spec. of *colchicum*, India, descript., Dymock. xxix, 122.
- Herniaria GLABRA**, analysis, Gobley. xxiii, 205, 454—analysis of ash, Wittstein. xxiv, 182.
- Herniarin**, GobleY. xxiii, 205, 454.
- Herpestes MONNIERA**, India, descript., Dymock. xxviii, 119.
- Herva SANTA MARIA** = *Chenopodium ambrosioides* and *suffruticosum*, Brazil. xxvii, 152.
- **TORMIGURRA** = *Chenopodium ambrosioides* and *suffruticosum*, Portugal. xxvii, 152.
- Hesperiden** fr. oil orange peel, Wright. xxii, 215.
- Hesperidin** fr. orange buds, Hilger. xxiv, 373—fr. fruits, Paterno and Briosi. xxiv, 375—Stabler. xxii, 392; xxiii, 195—of Vrij is narangin of Hoffman. xxvii, 526—of Brandes, Lebreton, Jonas and Pfeffer are identical; of Vrij and Dehn are mixtures, Hilger. xxiv, 374.
- Heteromeles ARBUTIFOLIA**, California, constituents, Lustig. xxx, 138.
- Heteropa ASAROIDES**, China. xxiv, 759.
- Heterophragma ROXBURGHII**, India, uses of tar, Dymock. xxvi, 159.
- Heuchera MICRANTHA**;—*H. PILOSISSIMA*, California. xix, 301.
- Hexa-nitrophenylamin**, coloring power, Kùpfer. xxiv, 382.
- Hibiscus CANNABINUM**;—*H. ELATUS*. xxiii, 192.
- **ESCULENTUS**, account and constituents, Laudron. xxiii, 191.
- **PURCATUS**. xxiii, 192.
- **ROSA-CHINENSIS**. xxiii, 192—yields safflower, China. xxiv, 747.
- **SABDARIFFA**;—*H. TRILOBUS*. xxiii, 193;—*H. TRIONUM*, Kansas. xxix, 448.
- Hickling, D. P.** xx, 99.
- Hides**, California. xxvii, 653.
- Hiedra**=*Rhus diversiloba*, California. xxix, 226.
- Hieraceum VENOSUM** in consumption, Forwood. xxx, 194.
- , literature, Besnard. xxii, 118.
- High wines**, first runnings contain aldehyd. and acetal, Krämer and Pinner. xviii, 245.
- Himanthalea LOREA**, yield of kelp and iodine. xxvii, 134.
- Hinau**=*Elæocarpus dentatus*, New Zealand. xxiv, 737; xxv, 366.
- Hing**=Bombay *Asafoetida*. xxiii, 179; xxvi, 160.
- Hingra**=Persian and Affghan *Asafoetida*. xxiii, 178; xxvi, 160.
- Hinna**=*Lawsonia alba*, Arabia. xxvii, 238.
- Hinojo**, Arg. Republ. xxiv, 762.
- Hippion ORIENTALE**, India, descript., Dymock. xxviii, 135.
- Hippocampus**, uses in China. xxiv, 747.
- Hippomanea** species, Mexico. xxiv, 768.
- Hippuris**=*Equisetum*, Greece. xxv, 122.
- Hirida**=fruit of *Terminalia chebula*, India. xxvii, 232.
- Hirneola AURICULÆ JUDÆ**, New Zealand. xxiv, 737.
- **POLYTRICHA**, New Zealand. xxiv, 738; xxx, 145.
- Hirsch, J. M.** Filtering paper and filters. xviii, 143—glycyrrhizin. xviii, 133—artificial mannite. xviii, 128—percolation. xviii, 146.
- Hirudo GEOMETRA**, France. xxiii, 231.
- see **LRECHES**.
- Histological RESEARCHES** (osmium amide better than osmic ac.), Owsjannikow. xix, 211.
- Hiyakuba**=*Roxburghia sessilifolia*, Japan. xxviii, 110.
- Hoang-hoa**=*Carthamus tinctoria*, China. xxii, 32.
- Hoang-nan**, identical with false *Angostura*, Planchon. xxvi, 213.
- Hodgetts, J.** xxv, 577.
- Hoffmann, Fr.** address. xxiii, 761—address of felicitation to N. German Apoth. Association. xviii, 116—pepsine. xviii, 74—pharmacopœia revision. xxv, 532—santonin. xxii, 456.
- discussions: xviii, 74, 115, 116; xxiii, 824, 843; xxiv, 680; xxv, 532.
- Hoffmann's MIXTURE** (quartz-sand, chlor. sod., nitr. copper) xxiii, 349.
- Hoheria POPULNEA**, var. **ANGUSTIFOLIA**, New Zealand. xxiv, 737.
- Hoh-oh**=*Typha japonica*, Japan. xxviii, 103.
- Hoitzia COCCINEA**, Mexico. xxiv, 173.
- Hojas DE SAN JUAN**, Arg. Republ. xxiv, 764.
- **DE SAN PEDRO**=*Daphnopsis salicifolia*, Mexico. xxiv, 771.
- **DE TUSCA**, Arg. Republ. xxiv, 762.
- Hokina g'za**=*Anemone cernua*, Japan. xxviii, 163.
- Ho-ko-so** = *Spilanthus oleracea*, Japan. xxi, 225.
- Holarthema ANTIDYSENTERICA**, India. xxiii, 120; xxiv, 724. See also **CONESSI BARK**.
- Holcus LANATUS**;—*H. MOLLIS*, ergot, Wilson. xxiv, 120.
- Holland**, pharmacopœia. xix, 316. See **NETHERLAND**.
- Holmes, Clay W.**, prepared castor oil. xxii, 378—home-made pills. xxiii, 619—syrops by percolation. xxiii, 607.
- Holmium**, Cleve. xxviii, 257; xxix, 262.
- of Cleve is identical with "X" of Loret. xxviii, 258—existence doubted, Boisbaudran. xxviii, 258.
- Hollywood** = *Weinmannia trichosperma*, Chili. xxiv, 765.
- Homoeopathic PHARMACY** (condensed), Lillard. xxi, 609—Ebert. xxi, 51—preparations can not be made in a drug store, Squibb. xxi, 88.
- Homatropin** = oxytoluol tropein, Ladenburg. xxviii, 321—effects disappear in 24 hours, Ladenburg. xxix, 337—preferable to atropin as suppressor of accommodat. power, Schele. xxix, 338—drug market. xxviii, 372; xxx, 473—prep. and prop., Power. xxx, 423, 4.
- **HYDROBROMATE** (bromide). xxix, 373; xxx, 425—valuable for short duration of effect, Keyser. xxix, 338.
- **MURIATE**;—*H. PICRATE*;—*H. SULPHATE*;—*H. and GOLD, CHLORIDE*. xxx, 425.
- Homocinchonia** is identical with Skraup's cinchonia, Hesse. xxvi, 567.
- Homocinchonidia**, prop., Hesse. xxvi, 567.
- Homocinchonidia** is ident. with Koch's cinchonidia, and Winkler's cinchovatina is chiefly this, Hesse. xxvi, 566—microsulphocy. test, Hesse. xxvii, 494—is ident. with cinchonidia of Skraup. xxvii, 496.
- Homoquinine**, Hesse. xxx, 405.
- Honey**, adult. (glucose flav. with locust flowers). xxi, 480; (slippery elm and sugar). xxiii, 232, 501; xxiv, 405—alcoh. fermentation prevented by perchloride iron, Almés. xxiv, 244—introduced to California Indians. xxvii, 448—California, peculiarities and product. xxvii, 448, 9, 625; xxviii, 300—collection, Creighton. xxiv, 206—coloring matter removed by hydrate of alumina, Henzel. xix, 312—composition (California, English, German, Greek, Jamaica, Lisbon, Mexico, Normandy, Welsh), Brown. xxvii, 450—test for glucose. xxvii, 448—purification: Bourgoin (tannin, Irish moss). xxviii, 60—Close (water on top, facilitates skimming) xxvii, 449; Dieterich (dialysis). xxvi, 528; Henzel (carbon. magnes.). xix, 312; Juehling (paper pulp; alumina hydr.). xxviii, 59; Müller (hydr. alumina). xxvii, 449, 450; Rieckher (hydr. alum.). xxii, 75—test for purity, Hager. xxiii, 232—statistics of U. S., Stacey. xviii, 141, 313.
- **ETHIOPIAN**, Villiers. xxvii, 449.
- **FENNEL**. xxviii, 60.
- fr. **MEXICAN HONEY ANT**, Krummeck. xxi, 649.
- **POISONOUS**, Armenia. xxvi, 529.
- **OF ST. JOHN BAPTIST**. xxv, 141.
- **TINTED** (by artif. feeding). xix, 313.
- Honey**, see also **MEL**.
- **ANT** of Mexico, discussion. xxi, 89—account, Saunders. xxi, 648; xxii, 171.

- Honigthee**—*Cyclopia longifolia* and *galeoides*, So. Africa. xxix, 217.
- Hopea ODORATA**, India. xxiv, 718.
- Hops**, detect. of sulphurous ac., Wittstein. xxvii, 267—adult. (spent hops treated with tinct. absynth.), Sweden. xxviii, 197—constituents (bracts cont. only tannin), Bissel. xxvi, 307—in California. xxvii, 626—cultivat. in New York, Bissel. xxvi, 306; in Wisconsin, Ramsey. xxiii, 224—cont. a ferment. which resists act. of boil. water, Sacc. xxiv, 203; denied by Pasteur. xxv, 229—lupulina, a volatile alkaloid, Griessmayer. xxii, 161—paper fr. stems. xix, 293—preserved (separate oil, and dry the remainder), Breithaupt. xxvi, 307.
- WILD, So. Europe (5 to 8 p. c. tannin), Tchech. xxix, 234.
- Hordeum DISTICHUM**, ergot, Wilson. xxiv, 120.
- Horkelia CUNEATA**;—H. FUSCA;—H. TENUILOBA, California. xix, 301.
- Horn-wort**—*Ceratophyllum demersum*, Kansas. xxix, 441.
- Horse-chestnut**, used for starch paste and alcohol. xxvii, 278.
- Horsemint** xxi, 450. see *MONARDA PUNCTATA*.
- , OHIO—*Blephilia hirsuta*. xxix, 446.
- Horse radish**, mineral constituents, Hilger. xxvii, 224.
- Horse weed**—*Ambrosia trifida*, Kansas. xxix, 441.
- Hottentot tea**—*Helichrysum serphyllifolium*, So. Africa. xxii, 119.
- Howellite**, Stassfurt. xxii, 186.
- Huai-shu**—*Sophora japonica*, China. xxv, 234.
- Hub-ul-kilkil**, a spec. of cherry, India, descript., Dymock. xxv, 207.
- Huckleberries**, coloring matter, Andrée. xxviii, 353.
- Huesos de fraile**—nuts of *Thevetia yccotli*, Mexico. xxv, 149.
- Huinque**—*Lomatia ferruginea*, Chili. xxiv, 765.
- Huisache**—*Acacia albicans*, Mexico. xxiv, 776.
- Humulus LUPULUS**, Kansas. xxix, 452, see also HOPS.
- Hunyadi Janos water**, artificial, Charteris. xxx, 58.
- Hura CREPITANS**, Mexico. xxiv, 771.
- Hurmal (HURMARO)**—seeds of *Peganum Harmala*, India. xxvi, 160.
- Hurshinghar**—*Nyctanthes arbor tristis*, India. xxiv, 718.
- Hwang-lien**—*Coptis teeta*, China. xxviii, 164.
- Hyacinth**, WILD—*Scilla Traveri*, Kansas. xxix, 447.
- Hydnocarpus INEBRIANS**, India, descript., Dymock. xxv, 195; xxvii, 228.
- ODORATUS—*chaulmoogra*, India. xxiv, 725.
- Hydrangea ARBORESCENS**, analysis, Bauer. xxix, 205—adult. of powd. xxx, 576—not attacked by *Tinea zeae*, Saunders. xxi, 627.
- AZISAI, Japan, uses, Taylor. xxviii, 174.
- Hydrargyrum**, see also MERCURY.
- *ÆTHYLO-CHLORATUM*, Maisch. xxii, 229.
- *BICHLORIDUM*, see CORROSIVE SUBLIMATE.
- *CHLORIDUM MITE*, see CALOMEL.
- Hydrastin (ALKALOID)**, berberin, oxyacanthin, dist. charact., Parsons. xxx, 434.
- (ELECTRIC) examined, Beach. xxiv, 412; xxv, 97—solubility, Parker. xxx, 128—prep., prop., Lloyd. xxvi, 803, 5—Wolff. xxix, 345.
- MURIATE—*Berberina muriate*. xxvi, 893.
- Hydrastis CANADENSIS**, adult. (beet root, serpent., podophyll., sanguinar.). xxiv, 405—adult. of powd., xxx, 576—third alkaloid, Burt. xxiv, 156; Hale. xxi, 232; Lerchen. xxvii, 196—dist. charact. of alkaloids, Parsons. xxx, 433—analysis (*xanthopuccina*), Lerchen. xxvii, 196—fixed oil, Lloyd. xxvi, 804—resinous substances, Lloyd. xxvi, 801—in Indiana. xxviii, 502—80 years ago. xxvi, 849.
- Hydrobromates vs. BROMIDES**, Bullock. xxiii, 707.
- see also Bromides of the respect. bases.
- Hydrocærulignon**, Liebermann. xxi, 395.
- Hydrocarbons**, act. of heated platin. and pallad. coils, Coquillion. xxii, 208.
- Hydrocellulose** (= friable), prep. and prop., Girard. xxiv, 307; xxx, 366.
- Hydrocinchonidia** of Forst and Bohringer ident. with cinchonidia, Hesse. xxx, 404.
- Hydrocinchonina**, Caventou and Willm. xviii, 262—is a decomp. prod., Hesse. xxiii, 402—prep., prop., Hesse. xxx, 404—identical with cinchonina, Skraup. xxvi, 584—Skraup prefers to call it: cinchotina. xxvii, 495.
- Hydroconchinine**, prop., Hesse. xxx, 405.
- Hydrocotarnin**, history. xxi, 373—physiol. act., Ott. xxvi, 277; Pierce. xxiv, 346—poisonous, Falk. xxii, 267—prep., Matthiesen and Foster. xxiv, 345.
- Hydrocotoin** (fr. Para coto), Jobst and Hesse. xxviii, 203.
- Hydrocotone**, Jobst and Hesse. xxviii, 202.
- Hydrocotyle ASIATICA**, India. xxiv, 725; xxviii, 119.
- Hydrocoumarin**, Zwenger. xix, 267.
- Hydrogen**. xviii, 216; xix, 177; xxi, 273; xxii, 173; xxiii, 238; xxiv, 207; xxv, 239; xxvi, 336; xxvii, 290; xxviii, 213; xxix, 240; xxx, 259.
- absorpt. by iron, Jacobs. xviii, 216; by nickel, Raoult. xviii, 217—by palladium, Graham. xviii, 217; Troost and Hautefeuille. xxiii, 315—act. of nascent upon nitric ac., Bourgoin. xix, 179—electrolized (analog. to ozone), Charbrier. xxi, 273—generation (explos. prevented by wire netting), Fresenius. xxii, 173—liquefied, Pictet; Cailletet. xxvi, 336, 339—metallic nature (palladium), Graham. xviii, 217; (amalgam with mercury), Lœw. xix, 177—by electrolysis of water with palladium as kathode, Böttger. xviii, 216—cheap production, l'essie du Mottay. xix, 177—purified, Scholig. xxv, 239—pure (fr. formiate pot.), Berthelot. xxvi, 336—reducing metallic oxides, temperature, Müller. xviii, 217—reduced solut. of silver, Scholig. xxv, 240—spontaneous combustion, Hofmann. xxvii, 290.
- ARSENIURETTED, solid (of Humpert) is finely divided arsenic, Hübner. xxii, 204—reaction with acids, Parsons. xxvi, 414.
- PEROXIDE, react. with iod. potassium, Schöne. xxvii, 292—account and applications, Ebell. xxx, 260—constitution, Traube. xxx, 258—is not decomposed by a boil. temperature, Böttger. xxi, 273—estimat. effective oxygen (bichromate method), Davis. xxvii, 291—in atmospheric air, Struve. xix, 178—in partially oxidized oil turp., Böttger. xxviii, 262—easiest way to oxidize any substance, Davis. xxvii, 292—preparation: Davis (peroxide bar., hydrofluor. ac.). xxvii, 291; Kletzinski (perox. bar., phosph. ac.). xix, 178; Thomsen (perox. bar., mur. ac.). xxiii, 239—for whitening teeth, Sauer. xix, 178—tests: Böttger (am.-nitr. silver). xxii, 174; Schœne (sulph. titan.). xxiii, 239; (comparison of var. tests). xxiv, 207; Struve (oxide lead). xix, 179; xxiv, 207.
- PHOSPHORETTED, act. of ozone, Houzeau. xxi, 271—pure (fr. iodphosphonium), Hopmann. xxi, 222.
- SULPHURETTED, act. of ozone, Houzeau. xxi, 271—apparatus: Capanema. xxx, 261; Casamajor. xxiv, 210; Cooley (balance). xxvii, 292; Hart (two test tubes within each other). xxix, 240; Kammerer (constant). xxv, 54; Müller (regulated by pinchcock). xxvi, 340; (syringe with iron sulphate immersed and withdrawn). xxviii, 213; (modif. of Brugnatelli). xxx, 262—combustion in nitrous fumes, Kessler. xxviii, 215—preparation: (modif. of Skey), Casamajor. xxx, 260; (sulph., paraffin), Fletcher. xxviii, 213; (galena, zinc, ac), Skey. xxi, 274—preserved (petroleum), Mohr. xviii, 225—pure (fr. calc. sulphide and mur. ac.), Otto. xxvii, 295; xxviii, 215—test paper. xxii, 52.
- Hydrometer**, BAUMÉ, fixed points as given by himself, Berthelot; Coulier; d'Almeida. xxvi, 47, 8—verificat. xxvi, 49.
- for SPECIAL PURPOSES, how to mark, Pile. xxii, 366; xxiii, 38.
- critical review (prefers, Wittstock's), Hirsch. xxv, 36.
- pouring liquid to be examined into the tube, Pile. xxi, 153.

- Hydrophyllaceae.** xxi, 221; xxiv, 134; of California. xix, 304; Kansas. xxix, 445.
Hydrophyllum VIRGINICUM, Kansas. xxix, 445.
Hydroquinidia, Hesse. xxx, 405.
Hydroquinine, Hesse. xxx, 405.
Hydroquinone. xxix, 373.
Hydroxæthyliden-TRIMETHYL-AMMONIUM-neu-rin. xxvi, 611.
Hygrina (Lossen and Woehler). xxvi, 765.
Hygrometer, Klinkerfues. xxv, 38.
Hygroscopic SUBSTANCES, preserved dry (over lime), Kirsten. xxix, 59.
Hymenea COURBARIL, Mexico. xxiv, 767, 776.
Hymenodictyon OBOVATUM and **H. EXCELSA**, India, descript., Dymock. xxv, 168.
Hyoscine is decomp. product of hyoscyamin, and ident. with atropin, Ladenburg. xxix, 340—source, Merck. xxx, 422.
 — **BROMIDE**; — **CHLORIDE**; — **IODIDE.** xxx, 473.
Hyoscyamin, identical with "light atropin," Ladenburg. xxviii, 336; with "light daturia," Merck. xxx, 422; with duboisin, Ladenburg. xxviii, 335—drug market. xxviii, 372; xxix, 373; xxx, 473—is a liquid, Merck. xxi, 383—microsublimating point, Blyth. xxvii, 483—preparation fr. seed, Höhn. xviii, 265—prop. and relationship, Ladenburg. xxviii, 334—yield, Thorey. xviii, 266—source, Merck. xxx, 422.
 — **CRYSTALLIZED.** act. diff. fr. that of amorph., Buchheim. xxv, 309—prop., Martindale. xxv, 309—prep., Duquesnel. xxx, 425.
 — **PLATINOCHLORIDE**, Schmidt. xxix, 335.
Hyoscyamus, adult. of powd. xxx, 576—alkaloids, Ladenburg. xxviii, 336; best extracted by chlorof., Wadilewski. xxv, 136—detect. in beer, Dragendorff. xxx, 339—collection, proper time, Maisch. xxi, 623; xxii, 107—contaminat. (bay leaves, straw, etc.). xxiv, 405—cultivat. at Banbury, Holmes. xxv, 136; Canada, Saunders. xviii, 185; xix, 290; Hitchins, Holmes. xxvi, 206; Lincolnshire, Holmes. xxx, 165—examin. of Indian, Greenish. xxix, 138—drug market. xix, 404; xx, 124; xxv, 336—germinat. of seed, Saunders. xxx, 567.
 — **ALBUS**, India, descript., Dymock. xxix, 138—Malta. xxvi, 167—nitrogenated compounds, Thorey. xviii, 277.
 — **NIGER**, India, uses of seed, Dymock. xxvi, 161—nitrogenated compounds, Thorey. xviii, 277.
Hypericaceæ of California. xix, 299—Kansas. xxix, 445.
Hypericum ANAGALLOIDES; — **H. SCOULERI**, California. xix, 299.
 — **PERFOLIATUM**, substituted by *Ascyrum stans* and *A. Crux Andreæ*. xxiii, 501—in Kansas. xxix, 445.
 — **SAROTHTA**, Kansas. xxix, 445.
Hypnea MUSAFORMIS in commercial Corsican moss, xxx, 141.
Hypodermic MEDICATION, what is it? Squibb. xxi, 645.
 — **PELLETS**, Wolff. xxix, 88.
 — **SOLUTIONS**, Powers. xxvii, 92—protected by one-sixth p. c. carbol. ac. (of the alkal.), Squibb. xxi, 589, 592; xxii, 82—by salicyl. ac., Squibb. xxv, 550; Limousin. xxiv, 79.
Hypoloma APPENDICULATA, cont. oxal. ac., Hamlet and Plowright. xxvi, 178.
Hypophosphites, see **SOLUTION**, **SYRUP**, etc.
Hypoquebrachin, Hesse. xxx, 184, 5.
Hyposulphites, test (soda and permangan. pot.). xix, 193.
Hypoxis RECTA, Kansas. xxix, 439.
Hyraceum, examin., Greene and Parker. xxviii, 210.
Hyrax CAPENSIS. xxviii, 210.
Hyssop. xxv, 336—germinat. of seed, Saunders. xxx, 567.
Hystrix FRUTEX (of Rumphius)—*Barleria prionitis*, India. xxviii, 125.
- I.**
- Iama-imo** — *Dioscorea japonica*, Japan. xxviii, 111.
 — **-njan-kusoo** — *Patrinia scabiosaefolia*, Japan. xxviii, 150.
Iangli pudwal — *Trichosanthes cucumerina*, India. xxv, 201.
 — **soorun** — *Amorphophallus sylvaticus*, India. xxv, 122.
Iba — fat fr. *Invingia Barteri*, Africa. xxix, 116.
Ibotin fr. *Ligustrum ibotu*, Japan, Martin. xxvii, 162.
Icaja, ordeal poison, Gaboon. xix, 286.
Ice ARTIFICIAL, by trimethylamin, Tellier. xxvii, 291—bisulphide carbon, Wartha. xix, 138.
 — **MACHINE**, Carré. xviii, 205.
 — **NATURAL vs. artificial** (artif. melts slower), xxii, 173.
 — **MEDICATED**, Martin (chlor. pot.,—chlor. sod.,—sulphurous acid). xxiv, 111.
Ice plant—*Monotropa uniflora*, Kansas. xxix, 444.
Iceland moss, see **CETRARIA-SUGAR**, Dutch Phar. Soc. xxx, 68.
Icica ALTISSIMA, yields Am. balm of Gilead. xxiv, 195.
 — **GUIANENSIS.** xxiv, 195.
 — **INCIENSO**, Mexico. xxiv, 768.
Igir — *Calamus*, Turkestan. xxi, 263.
Ignatia, used in tropics in fevers and snake bites. xxix, 335—drug market. xx, 121—historical and microscopical notes, Flückiger and Meyer. xxx, 181.
Iijenjo — *Dioscorea japonica*, Japan. xxviii, 111.
Ikeru — *Atractylis ovata*, Japan. xxviii, 148.
Ikleel-ul-malik — fruit of a spec. of *Melilotus*, India. xxvi, 167.
Ilaik-kalli — *Euphorbia nervifolia*, India. xxviii, 192.
Ilex CASSINE, analysis of leaves, Smith. xxi, 259; xxiv, 200.
 — **DECIDUA**, Kansas. xxix, 440.
 — **PARAGUAYENSIS**, account. xxvi, 302—see also **MATÉ**.
Illicium ANISATUM, China, descript., Holmes. xxix, 185, 6, 9.
 — **FLORIDANUM**, Florida, descript., Holmes. xxix, 187, 9.
 — **GRIFFITHII**, Bengal, descript., Holmes. xxix, 188, 9.
 — **MAJUS**, Singapore, descript., Holmes. xxix, 188, 9.
 — **PARVIFLORUM**, Georgia, Carolinas, descript., Holmes. xxix, 187, 9.
 — **RELIGIOSUM**, Japan, descript. and analysis, Eykman. xxix, 183—Holmes. xxix, 186, 9.
Illecebreæ. xxiv, 182.
Illinois, pharmacy law. xix, 314, 356; xxi, 506; xxix, 376, 381.
Illupi — *Bassia longifolia*, India. xxvi, 219.
Illustrations suggested, Maisch. xx, 32.
 — **ACIDIMETRIC** apparatus, Noel. xxvi, 377.
 — **ACID, ACETIC**, estimat. app., Weigert. xxviii, 305.
 — **ACID, HYDROFLUORIC**, bottle, Foord. xxiii, 33.
 — **ACID, PHOSPHOR.** app., Wenzell. xxx, 558—deposit. xxviii, 228.
 — **ACONITE** root. xxv, 173—Japan. xxix, 171, 2.
 — **ALCOHOL** weighing, Squibb. xxi, 553.
 — **AMMONIA** app., Diehl. xix, 519, 520—ammonia and chlorine condensat., Kern. xxiii, 31—determinat. app., Foster. xxix, 258; Knoblauch. xxx, 289.
 — **ANDIRA ARARоба**, microscop. xxviii, 182.
 — **ANGRÆCUM FRAGRANS**, microscop. xxix, 131, 2.
 — **ANGUSTURA.** microscop. xxiii, 189.
 — **ANTIARIS TOXICARIA.** xxvi, 309.
 — **APOCYNUM ANDROSÆMIFOLIUM**, microscop. xxix, 470, 2, 3; xxx, 180.
 — **APOCYNUM CANNABINUM**, microscop. xxix, 469, 472, 3; xxx, 180.
 — **APPARATUS** STAND, Robbins. xxvii, 57—Squibb. xxi, 536, 8, 9, 541. See also **PERCOLATOR**.
 — **ARALIA PAPHYRIFERA.** xxvii, 195.
 — **ARECA CATRECHU.** xxvi, 187.
 — **ARFOMETER**, normal, Hirsch. xxv, 37.
 — **ARROWROOT**, microscop. xxiv, 310—**NATAL**, xxvii, 146.
 — **ASARUM CANADENSE**, microscop. xxviii, 467.
 — **ASCLEPIAS CORNUTI.** xxx, 179.
 — **ASCLEPIAS VINCETOXICUM.** xxvii, 217.
 — **ASPIRATOR**, Proctor; Smith. xxv, 45—Richards. xxv, 44—Muencke. xxvi, 58.

Illustrations, ATOMIZER, Sprengel. xxiv, 213.

- **BADGE** of association. xxiv, 583; xxv, 19.
- **BALANCE**, Bunge. xxix, 28—Gorham. xxx, 26—Mendelejeff. xxiv, 52, 3—Parrish. xxvi, 45—Reinmann. xxvii, 40—Ruprecht. xxix, 29—Mohr-Westphal. xxv, 34—Westphal. xxix, 27.
- **BATH**, air-, Fleck. xxx, 53—water-, Benjamin. xxvii, 82; Müncke. xxiii, 32; xxv, 50.
- **BELLADONNA**, Japanese. xxviii, 121.
- **BERBERINA**, MURIATE, cryst. xxiv, 157.
- **BERBERIS AQUIFOLIA**. xxvii, 204.
- **BETEL**, microscop. xxx, 248.
- **BLAST APP.**, Hanks. xxvi, 59—lamp, Morrell. xxix, 45; Schober. xxix, 44; Thœrne. xxx, 50.
- **BLOW-PIPE**, Burgess. xxix, 46—Casamajor. xxiv, 58—Müncke. xxviii, 51—Rabs. xxiii, 41—Thomson. xxvi, 82—xxiii, 42, 3.
- **BOILER**, rapid, Symes. xxix, 48.
- **BOILING POINT**, determinat. app., Pawlewski. xxix, 48.
- **BOUGIES**, mould, Mitchell. xxvi, 137.
- **BRAYNER ANTHELMINTICA**. xxvi, 283.
- **BRUCIA**, spectrum. xxvii, 480.
- **BURETTE**, Pellet. xxix, 33—clamp, Benjamin. xxvii, 59—filling app., Röder. xxx, 28—stand, Pribram. xxii, 42; Squibb. xxi, 541—valve, König. xxiii, 39, 40.
- **BURNER**, Biedermann. xxvii, 51—Ebell. xxvi, 68—Fletcher. xxviii, 31—Gibbs. xxii, 40—God-effroy. xxvi, 69—Müncke. xxx, 49; xxii, 40, 1—Pribram. xxii, 39—Rabs. xxiii, 29—Stöckmann. xxiii, 28—Terquem. xxix, 47.
- **CALABAR BEANS**. xxvii, 456.
- **CAMPHOR**, Ngai. xxiii, 143.
- **CANANGA ODORATA**. xxix, 190.
- **CANTHARIS NUTALLII**;—**VESICATORIA**;—**VULNERATA**. xxiv, 506.
- **CAPSAICIN**. xxv, 318.
- **CARDAMOMS**. xxvi, 195, 6.
- **CASSIA BREVIPES** (chamæcrista). xxiii, 211.
- **CASSIA LENTIVA**, microscop. xxx, 239, 240.
- **CATECHU**. xxvi, 187.
- **CENTRIFUGAL DRYER**, Mohr. xxv, 53.
- **CHARCOAL** holder, Casamajor. xxiv, 59.
- **CHENOPODIUM ANTHELMINTICUM**. xxx, 158, 9.
- **CHENOPODIUM VULVARIA**, crystals. xxx, 159.
- **CHLORINE**, app. xxviii, 220.
- **CHONDODENDRON TOMENTOSUM**. xxii, 129, 130.
- **CINCHONIA**, microsulphocy. xxiii, 410; xxvi, 571; xxvii, 490, 1.
- **CINCHONIDIA**, microsulphocy. xxvi, 571, 2; xxvii, 490.
- **CISSAMPLOS PARRIRA**. xxii, 131.
- **CLAMPS**, parallel, Müncke. xxvii, 58.
- **COCA**. xxiv, 175; xxv, 188.
- **COFFEE**, Arabia and Mogdad, microscop. xxix, 210.
- **COPERNICIA CERIFFRA**. xxvi, 183, 5.
- **COLA ACUMINATA**. xxvi, 254, 5.
- **COLOCYNTH**, microscop. xxv, 197.
- **COLOR COMPARATOR**, Leeds. xxvi, 84—Hager. xxx, 55.
- **CONDENSER**, Abraham. xxx, 47—Bartlett. xxx, 45—Borda y Balcell. xxviii, 34—(vapor), Hager. xxv, 52—Rice. xxvi, 77—Squibb. xxi, 535.
- **CONTROLLER** (receiver), Mohr. xxv, 51.
- **CRUCIBLE**, PLATIN, perforat. bottom, Gooch. xxvii, 48.
- **CYCLOPIA BRACHYPODA**, microscop. xxix, 220—**LONGIFOLIA**, microscop. xxix, 218, 9.
- **CYPRIPEDIUM SPECTABILE** (atavism). xxix, 475.
- **CYSTEODEMUS ARMATUS**. xxiv, 506.
- **"DAIBUSHI"** (aconite). xxix, 174.
- **DECANTING JAR**, Gawalowski. xxiii, 36.
- **DIALYSER**. xxvi, 56, 7—Klie. xxvii, 89.
- **DIPTERYX ODORATA**. xxvi, 292.
- **DISPENSING** department, Hancock. xx, 192, 4, 5, 6.
- **DISPLACEMENT**, continuous, Cazeneuve and Caillot. xxv, 49—Drechsel. xxvi, 54—Guérin. xxviii, 28—Weigelt. xxix, 37.
- **DISTILLATION**, FRACTIONAL, app., Bevan. xxvi, 76—Hempel. xxx, 46.
- **DROP** attachment to bottles, Bravais. xxix, 53—Wharton. xxiv, 90—xxx, 55.

Illustrations, DROSEREA LONGIFOLIA;—ROTUNDIFOLIA. xxvii, 226.

- **DRUG MILL**, Enterprise. xxiii, 582, 3—Hance. xx, 180, 1; xxiii, 579—Schröder & Co. xxvii, 42—Swift. xxiii, 577, 584, 5, 6—Thomas. xxiii, 578—Trœmner. xxiii, 581.
- **DRYING CLOSET**, Greenish. xxvii, 54—Kirchmann. xxx, 51—Kirchner. xxx, 52—Roeder. xxviii, 37—Rohrbeck. xxviii, 36.
- **DUBOISIA MYOPOROIDES**. xxvii, 161.
- **ELETTARIA CARDAMOMUM**. xxvi, 195.
- **EMULSION** app., Alvergniat. xxvi, 124—Hartwig. xxiv, 85.
- **EPICAUTA CINEREA**;—**VITTATA**. xxiv, 506.
- **ERIODICTYON CALIFORNICUM**. xxiv, 134.
- **EUPATORIUM AYAPANA**, microscop. xxix, 157.
- **EVAPORATING** app. (regulating), Geyer. xxiii, 30—Süss. xxix, 51—Wagner. xxviii, 35.
- **EXOGONIUM PURGA**. xxiii, 155.
- **EXTRACTION** app., Gantler. xxix, 36—Thorn. xxx, 36.
- **FAT** examining app., Königs. xxvii, 422—Tollens. xxvii, 421.
- **FEROUS SALT**, app., Stock. xxvii, 349.
- **FILTER** (asbestos), Trobach. xxx, 40—(automatic balance), Seaman. xxiv, 57—Gigot. xxix, 38—Holzinger. xxviii, 46—(excluding contact with air). xxvii, 45—(for charcoal and sand), Haagen. xxviii, 28.
- **FILTER**, CONTINUOUS, Casamajor and Senff. xxx, 38—(siphon arrangement). xxvi, 65—drop. xxv, 42.
- **FILTER**, RAPID, Davenport. xxix, 40—Fisher. xxv, 40—Hildebrand. xxv, 39—Hindley. xxvi, 62—Mattison. xxvi, 63—Mollin. xxix, 42—Parbridge. xxix, 39—Stevens. xxiv, 55—xxx, 38.
- **FILTER PUMP**, Buck. xxiv, 54; xxvi, 60—Cohn. xxx, 39—for VISCID liquids, Elsdon. xxix, 42—WEIGHING, Gilbert. xxx, 27—bag, Taylor (SUGAR-HOUSE) xxvi, 64—STAND (wire). xxvi, 66. See also PERCOLATOR STAND.
- **FLAVESCIN** app., Lux. xxix, 357.
- **FORCE PUMP**, stoneware. xxv, 363.
- **FUCUS NODOSUS**. xxvi, 175—**SERRATUS**. xxvi, 176—**VESICULOSUS**. xxvi, 174.
- **FUNNEL**, separating, Bulk. xxv, 43—steam, Abraham. xxx, 48—rapid filtering, Geissler. xxix, 38—platin. cone, Gooch. xxvii, 49; Parsons. xxvii, 49—xxvii, 47.
- **GAS** absorber, Gore. xxvi, 83—delivery tube, Vulpius. xxviii, 39.
- **GAS GENERATOR** (constant), Kämmerer. xxv, 55—Süss. xxvi, 81—Thomson. xxvi, 82—Woodward. xxii, 43, 4.
- **GAS LIQUEFYING** app., Cailletet. xxvi, 337, 8—Pictet. xxvi, 334.
- **GAS VALVE** for regulating temp., Weinhausen. xxvii, 53.
- **GRUMMET**, Squibb. xxi, 540.
- **HEATING** app., Hempel. xxvi, 67—Meyn. xxix, 51.
- **HERB** press, Harrop. xx, 179.
- **HOMATROPIN**. xxx, 424.
- **HYDRASTIA** cryst. xxiv, 157—"third" alkal., Hale. xxiv, 158.
- **HYDROGEN**, SULPHURETTED, app., Capanema. xxx, 261—Casamajor. xxiv, 211—Cooley. xxvii, 294—Müller. xxvi, 340—xxviii, 214.
- **ILEX PARAGUAYENSIS**. xxvi, 302.
- **ILICIUM ANISATUM**. xxix, 186—**GRIFFITHII**. xxix, 188—**MAJUS**. xxix, 188—**RELIGIOSUM**. xxix, 183, 7.
- **IMPERATORIUM OSTRUTHIUM**. xxv, 172.
- **IPECAC**, powd., microscop. xxix, 164.
- **JABORANDI**, xxiii, 184; xxv, 179.
- **JALAP**. xxiii, 155.
- **JERVIA**. xxiv, 357, 9, 360, 1, 2.
- **KALMIA LATIFOLIA**, gland. xxx, 190.
- **KATSUYAMA-BUSHI** (aconite). xxix, 177.
- **KUSU-UZU** (aconite). xxix, 180, 1.
- **LABORATORY** app., Corder. xxv, 46—Enders. xxiii, 27.
- **LACTOMETER**, Soxhlet. xxix, 360—Feser. xxvi, 628.
- **LADANOSTIRION**. xxvii, 225.
- **LAMP**, alcohol, Mohr. xxii, 38.
- **LAWSONIA ALBA**, microscop. xxix, 208.

- Illustrations, LIATRIS ODORATISSIMA, microscop.** xxix, 159, 160.
- **LOZENGE BOARD, Harrison.** xxviii, 87—**Hill.** xxiii, 105—**Marcy.** xxx, 125—**Slocum.** xxviii, 86.
- **LUPULIN.** xxv, 229.
- **LYCOPodium.** xxv, 120.
- **MACROBASIS ALBIDA;—ATRIVITTATA;—SEGMENTATA.** xxiv, 506.
- **MATÉ.** xxvi, 302.
- **MEASURING-TAP, self-registering.** xxii, 47.
- **MECONIOSIN.** xxvi, 621.
- **MEDICAGO SATIVA.** xxx, 163.
- **MELOE ANGUSTICOLLIS.** xxiv, 506.
- **MERCURY, PURIFYING, Brühl.** xxvii, 370; **Weber.** xxviii, 252—**TESTING, Biewand.** xxix, 276; **Teubner.** xxix, 277.
- **MICROTOME, Schneider.** xxix, 52.
- **MILK analysis, app., Baumhauer.** xxv, 325—**Gerber.** xxv, 327. See also **LACTOMETER.**
- **MINIM MEASURE.** xxix, 31.
- **MORPHIA, spectrum.** xxvii, 480.
- **MORTAR, Buck.** xxix, 34.
- **MYLABRIS CICHOREI.** xx, 247; xxiv, 506.
- **MYLABRIS PHALERATA.** xx, 252.
- **NICOTIN app.** xxx, 167.
- **OILS, ESSENT., "enfleurage."** xxiv, 275, 6—**"infusion,"** xxiv, 276—**still (French).** xxiv, 273; **Melnikoff.** xxx, 318.
- **OIL LEMON, app., Monfalcone.** xxvii, 387.
- **OPIUM ASSAY, Proctor.** xxvi, 275.
- **OXYGEN app.** xxx, 255.
- **PARERA.** xxii, 129-131.
- **PATCHOULY.** xxix, 143, 4, 5, 6, 7, 8.
- **PAULLINIA PINNATA.** xxv, 189, 190.
- **PEDICULUS MELITTÆ.** xxiv, 511.
- **PERCOLATOR, Diehl.** xxvii, 729—**Fenner.** xxx, 35—**(vacuum), Klie.** xxx, 34—**Rosenwasser.** xxx, 32, 540—**Squibb.** xx, 186; xxvi, 100, 102, 3, 4, 735, 9, 740, 742—**Zulkowski.** xxii, 45. See also **DISPLACEMENT and EXTRACTION.**
- **PERCOLATOR for cinchona analysis, Cleaver.** xxiv, 150—**for syrup, Steros, Jr.** xxviii, 73—**UPWARD percolation, Elborne.** xxviii, 79.
- **PERCOLATOR STAND, Remington.** xxvi, 52. See **APPARATUS STAND.**
- **PILOCARPUS PINNATIFOLIUS.** xxiii, 184.
- **PILL COMPRESSOR, Remington.** xxiii, 624; xxiv, 89—**Smedley.** xxvii, 99, 100.
- **PILL DIVIDER.** xxix, 87.
- **PINCHCOCK.** xxi, 539.
- **PIPER METHYSTICUM.** xxv, 223, 4, 5.
- **PIPER RETICULATUM.** xxv, 179.
- **PIPETTE, measuring.** Drew. xxvii, 58—xxix, 31.
- **PLANTAGO ISPAGHULA.** xxvi, 203.
- **PLASTER MACHINE, (Oberdörffer).** xxviii, 47, 48, —**PERFORATOR, Remington.** xxvi, 94.
- **PODOPHYLLUM, microscop.** xxv, 421, 2.
- **POISON closet, Holbe.** xxvi, 88.
- **POWDER app.** xxv, 47.
- **PRECIPITATE washing app., Andrejeff.** xxx, 43—**Hinsdale.** xxx, 42.
- **PRESCRIPTION clamps, Schelenz.** xxvi, 87.
- **PRESS, George.** xxvii, 43—**Enterprise.** xxviii, 78—**Schlag and Berend.** xxviii, 30.
- **PYROTA MYLABRINA.** xxiv, 506.
- **QUEBRACHO COLORADA, microscop.** xxix, 232.
- **QUININE test tube, Hesse.** xxvii, 500—**estimat.** app. xxx, 411.
- **QUINIA, SULPHATE.** xxvi, 570.
- **QUINIA, MICROSULPHOCY.** xxiii, 409; xxvi, 570; xxvii, 489.
- **QUINIDIA MICROSULPHOCY.** xxiii, 410; xxvi, 571; xxvii, 491, 2.
- **REAGENT BOTTLE (excluding the air), Ridout.** xxii, 46.
- **RHAMNUS PURSHIANA.** xxvii, 263.
- **RHEUM OFFICINALE.** xxiv, 130.
- **RHUS AROMATICA.** xxix, 228, 9.
- **ROSE, coloring matter, cryst. and spectrum.** xxv, 205, 6.
- **RUBUS VILLOSUS, microscop.** xxx, 236, 7.
- **SANDBLAST.** xxix, 55.
- **SANGUINARIA, microscop.** xxix, 202, 3.
- **SANTONIN, spectrum.** xxvii, 480.
- **SARATOGA, geological strata and origin of springs.** xxviii, 487, 9.
- Illustrations, SCOPOLIA JAPONICA.** xxviii, 121.
- **SEIDLITZ POWDER machine, Doane.** xxvi, 133.
- **SENEGA.** xxvii, 214, 7; xxx, 225—**senega, false.** xxx, 224.
- **SENNA, Alexandria, microscop.** xxx, 239, 240.
- **"SEN-UZU" (aconite) Japan.** xxix, 176.
- **"SHIRAKAWA-UZU" (aconite) Japan.** xxix, 178.
- **SIDA MYLABRIS.** xx, 251.
- **SIEVES, Müller.** xxvi, 50.
- **SIKIMIN, crystals.** xxix, 183.
- **SILPHIUM LACINIATUM, microscop.** xxx, 193, 4.
- **SIPHON, Gawalowski.** xxiii, 37—**(for poisons), Ridout.** xxiii, 38—**Sedlacek.** xxii, 45.
- **SODIUM, ETHYLATE.** xxx, 343.
- **SOLANUM PANICULATUM.** xxvi, 204.
- **SOLUBILITY AT HIGH TEMP., app., Meyer.** xxx, 30.
- **SPEC. GRAV. float, Dunnington.** xxviii, 26—**app., Sprengel.** xxii, 37; **Taylor.** xxvi, 46.
- **SPEC. GRAV. BOTTLE for inflammable liquids, Tribe.** xxii, 38.
- **STAR-ANISE, true and Japanese.** xxix, 183-188.
- **STARCHES: BEAN.** xxvi, 507—**BUCKWHEAT.** xxvi, 510—**CASSAVA.** xxv, 130—**CORNSTARCH.** xxvi, 508—**false COSTUS.** xxvi, 226—**OAT.** xxvi, 509—**POTATO.** xxiv, 309; xxvi, 506—**RICE.** xxvi, 509—**SAGO.** xxiv, 309—**SCAMMONY.** xxiii, 152—**TAPIOCA.** xxiv, 309—**TURMERIC.** xxvi, 511—**WHEAT.** xxiv, 311; xxvi, 506.
- **STEAM-GENERATOR, Garrison.** xxx, 45.
- **STILL, Remington.** xxvi, 71; xxvii, 52. See also **CONDENSATOR.**
- **STILL for alc. in fermented liquids, Behrendt.** xxviii, 32—**for bromine.** xxv, 244—**for ether, Remington.** xxviii, 277.
- **STILL, steam supply-pipe, Müller.** xxvi, 73.
- **STOP-COCK, Hart.** xxviii, 39.
- **STRAINER, Müller.** xxvi, 66.
- **STRYCHNIA, spectrum.** xxvii, 480.
- **STRYCHNOS CREVAUXII.** xxix, 150, 1, 2.
- **SUCTION and pressure app., Bulk.** xxv, 41.
- **SUPPOSITORY MOULD, Archibald.** xxvii, 108—**Berquier.** xxviii, 70—**Davidson.** xxviii, 69—**Lee.** xxviii, 71—**Painter.** xxvii, 107.
- **TANNIN, estimat., app., Thomson.** xxiv, 340.
- **TITRATION arrangement.** xxix, 32.
- **TONKA.** xxvi, 292, 3.
- **UREA-METER, Apjohn.** xxiii, 470—**Blackley.** xxv, 333—**Depaire.** xxvi, 640, 1—**Dupré.** xxvi, 637—**Esbach.** xxv, 331—**Maxwell and O'Keefe.** xxvi, 639—**Yvon.** xxv, 334.
- **VACUUM app., Lenz.** xxvi, 74.
- **VERATRIA.** xxiv, 357.
- **WAFER, dose-compressor, Digne.** xxvii, 102.
- **WAFER, press, Limousin.** xxii, 87—**McBoring.** xxiv, 95—**Studer, Jr.** xxiii, 90.
- **WASH BOTTLE, Foord.** xxiii, 37; **Johnson.** xxvi, 79—**jet, Bunsen.** xxvi, 80.
- **WEATHER-MAPS.** xx.
- **XANTHIUM SPINOSUM.** xxv, 159.
- **YHLANG.** xxix, 190.
- Impatiens FULVA;—PALLIDA, Kansas.** xxix, 445.
- Imperatorium OSTRUTHIUM, descript. of root,** Holmes. xxv, 172.
- Incense, fr. Icica incienso and Rosmelia floribunda, Mexico.** xxiv, 768.
- **wood—Icica guianensis.** xxiv, 195.
- Incombustibility of fabrics, Patera.** xix, 171.
- Indayuçu—Anda Braziliensis.** xxvii, 267.
- Index, GENERAL, discussion.** xviii, 112—**committee.** xix, 53, 97—**resolution.** xix, 114.
- **DECENNIAL.** xxviii, 499, 548.
- India (East), chemicals, Centen. exhib.** xxiv, 786—**DRUGS, Evers.** xxiii, 119; **Centen. exhibit.** xxiv, 714, 724; **Dymock.** xxiii, and subsequent volumes—**DYES, Centen. exhibit.** xxiv, 714, 6—**GUMS and RESINS, Centen. exhibit.** xxiv, 718—**oil seeds, Centen. exhibit.** xxiv, 721—**OPIMUM, Centen. exhibit.** xxiv, 726—**SPICES, Centen. exhibit.** xxiv, 719.
- **INK, Ritfalt.** xxiii, 118.
- **RUBBER.** See **CAOUTCHOUC.**
- Indian CORN, native, Utah.** xxvii, 136. See also **MAIZE.**
- **DRUGS, Stacey.** xxi, 616.
- **GUM NUTS.** See **STRYCHNOS POTATORUM.**
- Indiana pharmacy laws.** xxx, 476, 485.

- Indican**, estimat. in urine, Weber. xxvii, 546.
- Indigo**, cultivat. and manuf. in India (Pondicherry), Dépière. xxvi, 290—in India (Bengal), details of manufact. xxiv, 714—estimat. in presence of salts of iron, Wilson. xxvi, 622; amount of ashes is more correct, Löwenthal. xxi, 392—detect. in wine, Chancel. xxvi, 266—history. xxiv, 714—preparat. (use of ammonia instead of lime), Sayers. xxiii, 274.
- **SYNTHESIS** (starting fr. benzoate of calc.), Baeyer and Emmerding. xix, 274—(isatin and phosph. pentachlor.), Baeyer. xxvii, 532—(cinnamic acid), Baeyer. xxix, 355—history and manufacture. Baeyer. xxx, 446; Roscoe. xxx, 445.
- “**GAUD.**” India. xxiv, 716.
- fr. *Bletia Tankervillea* and *Callanthe veratrifolia*, Schunk. xxvi, 624—fr. *Polygonum tinctorium*, Schunk. xxvi, 623.
- **CARMINE**, Joclet. xxvi, 624.
- **WILD**, adult. of powd. xxx, 576. See also **BAPTISIA TINCTORIA**.
- Indigofera TINCTORIA**. See **INDIGO**.
- Indigotin**, estimat. in commercial indigo, Damoiseau. xxx, 446—directly upon the textile fibre, (ortho-nitrophenyl-propionic ac.), Rosenstiehl xxx, 445—solubility in boiling alc., methyl. alc. and in carbol. ac., Méhu. xxi, 392; in anilin, Aguiar and Bayer. xix, 273.
- Indium**. xviii, 237; xxi, 304; xxii, 197; xxvii, 352.
- act. on nitric ac., Acworth and Armstrong. xxvi, 343—prep., Böttger. xviii, 237; Godeffroy. xxi, 305—separation fr. blende, Jungfleisch. xxvii, 352.
- **ACETATE**, Godeffroy. xxi, 307.
- and **AMMONIUM SULPHATE**, Rössler. xxii, 197.
- **BROMIDE**; — **CHLORIDE**; — **CHROMATE**; — **FORMATE**; — **IODIDE**; — **OXIDE**; Godeffroy. xxi, 306, 7.
- **OXIDE** fr. sulphite, Bayer. xxi, 304.
- and **POTASSIUM CYANIDE**; — **SUBOXIDE**; — **SULPHATE**; — **SULPHIDE**; — **TARTRATE**, Godeffroy. xxi, 306, 7.
- Indol**, fr. albumen, Nencki. xxiv, 383.
- Induar**, a species of aconite, Inoia, descript., Dymock. xxvi, 164.
- Indulin**. xxi, 199.
- Iné**—arrow poison fr. Gaboon. xxi, 222—*Strophanthus hispidus*, Africa. xxv, 28, 150.
- Infant FOOD**, Müller. xxiv, 110. See also **FOOD FOR INFANTS**.
- Infercul**—*Cistus salvifolius*, Morocco. xxiii, 204.
- Inflammable mixtures** xix, 169.
- Inflammation**, paint (conc. tinct. cimicif.), Close. xix, 488.
- Infusions**, act. of alkalies and their salts in promot. extract., Blackwell. xxvii, 70—distilled water better than common, Marais. xxii, 76.
- **f. FLUID EXTRACTS**, Saunders. xxvii, 710.
- **PRESERVED** (chlorof.), Barnes; Barrett. xxiii, 68—(cotton stopper), Almén. xxiii, 68—(salicyl. ac.), Baden-Benger. xxiv, 69.
- **APPARATUS** with const. level, Hoffmann. xxvii, 71.
- **CHINESE**. xxii, 33.
- Infusion BUCHU** fr. fld. extr. (milky), Saunders. xxvii, 710.
- **CALUMBA** fr. fld. extr. (satisfactory), Saunders. xxvii, 710.
- **CARNIS FRIGIDE PARATUM**, Dutch Phar. Soc. xxx, 70.
- **CINCHONA FLAVA** fr. fld. extr. (satisfactory), Saunders. xxvii, 710.
- **COCA**, Shuttleworth. xxiii, 69.
- **COMPTONIA ASPLENIFOLIA** (sweet fern), Chiles. xxii, 76.
- **DIGITALIS**, causes of decomposition, Binz. xxviii, 45—fr. fld. extr. (satisfactory), Saunders. xxvii, 711—tinct. cinnam. to be omitted, Prall. xxvii, 72.
- **GENTIANA** (with liq. sod. chlorin.), Blackwell. xxvii, 71.
- **GENTIAN. COMP. CONC.**, Diehl. xxi, 172—Rother. xxi, 172—Symes. xxiii, 69.
- **IPECAC** (color depends on the water), Paulack. xxviii, 45.
- **KRAMERIA** fr. fld. extr. (satisfactory), Saunders. xxvii, 711.
- Infusion LAMINARIA FLEXICAULIS**, Wheeler xxx, 70.
- **PARIRA** fr. fld. extr. (satisfactory), Saunders. xxvii, 711.
- **PRUNUS VIRGINIANA**, fr. fld. extr. (not satisfactory), Saunders. xxvii, 711 — (glycerin), Moore. xxi, 172.
- **PRUNUS VIRGIN.** and **TAR**, Moore. xxi, 172.
- **PURGATIVES** (senna, frangula), Perschke. xxx, 70.
- **QUEBRACHO**, Burgos. xxviii, 46.
- **RHEUM**, fr. fld. extr. (opaque), Saunders. xxvii, 711.
- **ROSA** (glycerin), Barnes. xxii, 76.
- **SENNA**, fr. fld. extr. (satisfactory), Saunders. xxvii, 711.
- **SENNA COMP.**, Philadelphia Hosp. xxiv, 69.
- **SERPENTARIA**, fr. fld. extr. (milky), Saunders. xxvii, 712.
- **SPIGELIA**, fr. fld. extr. (satisfactory), Saunders. xxvii, 712.
- **TARAXACUM**, fr. fld. extr. (satisfactory), Saunders. xxvii, 712.
- **VALERIANA**, fr. fld. extr. (milky), Saunders. xxvii, 712.
- **ZINGIBER**, fr. fld. extr. (milky), Saunders. xxvii, 712.
- Ingalls, J.**, discussions: xxv, 504, 507, 518; xxvi, 900, 908; xxx, 633, 606.
- Injection ACID SALICYLIC**, Maury. xxiv, 112.
- Ink, COPYING**, Atfield. xxx, 134 — (red-black), Gintl. xxvi, 513.
- “**DIAMOND**,” Slocum. xxix, 55.
- **FIREPROOF** (black lead). xxvii, 122.
- **HECTOGRAPH**. xxviii, 96; xxix, 112.
- **INDELIBLE** (indestructible)—anilin black, Puscher. xviii, 213; xxvii, 127—Prussian blue, Niessen. xxi, 199; xxvi, 154—pot., sulph., leather, Braconnot. xxvii, 128; xxviii, 96—waterglass, lampblack, Gafford. xxiii, 119—waterglass, carmine, Böttger. xxii, 55.
- **INVISIBLE** (sugar, sulph. ac.). Vogel. xxiii, 119.
- **LABELING** (shellac, borax, etc.), Bering. xxix, 113.
- **PORTABLE** (blotting pads saturated), Böttger. xxii, 54.
- **REAGENTS**, Thompson. xxix, 113.
- **STAINS removed** (pyrophosp. sod.). xxi, 199; xxx, 134.
- **STAMPING**. xxii, 55; xxiv, 113; xxvii, 128; xxviii, 96; xxix, 113—indelible (tar, lampblack). xxiv, 113; (vermillion, sulph. iron). xxi, 199.
- **WRITING, BLACK** (atramin). xxviii, 96; (logwood, borate chrom.), Devilliers. xxx, 133; (logwood, al., mur. ac., iron), Schmieden. xxx, 134; (nut gall, persalt iron), Facilides. xxi, 198; (nut gall), Fairthorne. xxx, 133; (vanad., pyrogall.), Böttger. xxii, 54; xxvi, 406; (logwood, vanad.). xxvi, 406; (indulin), Coupier and Collin. xxi, 199—**BLUE** (anilin), Viedt. xxiii, 119—**GREEN** (anilin), Viedt. xxiii, 119—**RED**, (carmin., acet. ammon.). xxvi, 154; (anilin), Viedt. xxiii, 119; (logwood, alum). Bell. xxvi, 154—**VIOLET** (anilin), Viedt. xxiii, 119; (logwood, protochlor. tin), Bell. xxvi, 154—**YELLOW**, (anilin), Viedt. xxiii, 119.
- **plant of New Granada**—*Coriaria Thymifolia*. xxi, 258.
- In L'yang**—*Artemisia capillaris*, Japan. xxviii, 145.
- Inosit**, in leaves of *Fraxinus excelsior* (ident. with animal inosit), Gintl. xviii, 289—in walnut leaves, Tanret and Villiers. xxx, 370—test, Scherer. xxx, 370—estimat. in wines, Rössler. xxx, 222.
- Insects**, enemies of drugs, Saunders. xxi, 624; xxii, 171—destroyed by chlorof., Squibb. xxi, 629.
- Insect powder**, modes of action; indigenous plants, Garrigues. xix, 505—Persian, active principle, Rother. xxv, 157; Dal Sie. xxviii, 147—adult. xxiii, 522; xxiv, 418—comparat. value, Kalbrunner. xxiii, 167, 522; Saunders. xxvii, 176.
- See also **PYRETHRUM ROSEUM**.
- Internal REVENUE**, sect. 22 of “Little Tariff Bill.” xxiii, 543.
- International PHARMACEUTICAL CONGRESS**, invitat. to meet in U. S. xviii, 114; xix, 71, 74, 75; xxii, 471; xxiii, 770.
- **PHARMACOPŒIA**, Maisch. xxii, 519.

- Intsijin**—*Artemisia capillaris*, Japan. xxviii, 145.
- Inula**, as expectorant, Korat xxx, 191—might be substit. for *Costus*, Dioscorides. xxvi, 227.
- **CHINENSIS**, China. xxiv, 753.
- **CORYZA**, leaves as adult. of *digitalis*. xxix, 137.
- **PULICARIA**, worthless as insecticide, Kalbrunner. xxiii, 167.
- Inulin** yields levulinic ac., Siebold. xxiv, 337—combinat. with alkalis, Pfeiffer and Tollens xxx, 366—correct formula, xxx, 366—found in *costus* (*Aplotaxis auricul.*), Flückiger. xxvi, 227—occurrence in plants and yield (*Inula*, *Anacyclus*, *Cichorium*, *Dahlia*, *Taraxacum*), Dragendorff. xviii, 269—best fr. *Dahlia*, Dragendorff. xviii, 270—fr. *Dahlia* and *Inula* differ, Ferrouillat. xviii, 270—relation, Kiliani, xxi, 308.
- Invertin**, fr. yeast, Donath. xxiv, 300.
- "Invisible," PALMER'S**, analysis, Risser. xxiv, 420.
- Invitations**, discussion. xxi, 75, 84.
- Iodal**, physiol. prop., Robertson. xix, 254—as an anæsthetic, Guyot. xxi, 337.
- Iodates**, fr. barium iodate, Stevenson. xxvi, 356—test (phosph. water, starch), Corne. xxiv, 220; Pollaci. xxii, 182; xxiii, 250; (pyrogallie ac.), Jacquemin. xxii, 182.
- Iodides**, insoluble, estimat. Mensel. xix, 190—containing iodates, injurious to health, Rabuteau. xvii, 229—prep. fr. iodide barium, Stevenson. xxvi, 356.
- **DOUBLE**, mutation of colors, Mensel. xix, 191.
- Iodina RHOMBIFOLIA**, Brazil. xxviii, 138.
- Iodine**. xviii, 221; xix, 187; xxi, 277; xxii, 181; xxiii, 246; xxiv, 219; xxv, 246; xxvi, 355; xxvii, 307; xxviii, 218; xxix, 250; xxx, 276.
- act. upon resins, gum resins, balsams, Hirschsohn. xxvi, 458; of sulph. ac., Krauss. xxi, 277—adult. (25 p. c. sawdust), Remington. xxi, 494—yield fr. algæ. xxvii, 132—analysis of commercial, Wanklyn. xxi, 144, 494—contaminat. (water), Tissandier. xxii, 315; (cyanogen), Wittstein. xxi, 494; Semenoff. xix, 189—is probably a compound, Meyer. xxviii, 219—drug market. xix, 299; xxi, 429; xxii, 635; xxv, 349; xxvii, 560, 574; xxix, 373; xxx, 467—estimation: Frebault (cochineal). xxviii, 224; Klemp, (permang. pot., chlor. zinc). xxx, 276; Mohr, (subchlor. copper). xxiii, 248; Reinige (permang. pot.). xviii, 221; Field and Huschke, in pres. of brom. and chlor. (nitr. silver). xviii, 221; in varec, Schott (hyposulph., starch). xxviii, 224; in potable water, Chatin. xxv, 246—hypodermic solut., Fränkel. xxvii, 94—incompatible with essent. oils and tannin, Wilder. xxvii, 96—**MANUFACTURE**: fr. kelp. xxiii, 247; xxvii, 308; Galloway. xxvii, 307; fr. fresh-water plants, Zenger. xxiii, 246; by dialysis, Telieux and Allary. xxix, 250; fr. "caliche," (Peru), Lachmann. xix, 187; Thiercelin. xix, 187; Langbein. xxvii, 309; fr. phosphorite, Thiebault. xxiii, 246—recovered fr. iodide of mercury, Henry. xviii, 222; fr. iodoform residues, Smith. xxiii, 247—solubilities, Hager. xix, 189; in alc., Candidus. xxx, 565; in glyc., Farley. xxviii, 285; in oil bitter almond, Blackwell. xxvii, 301—spec. grav. differs with temperature, Crafts, Meyer, Lüblin. xxviii, 218—starch react. prevented by albumen, Pluchot. xxv, 246; by strong alc., Vogel. xxii, 224; by rhubarb, Husson. xxiii, 146; Greenish. xxvii, 150—starch test more delicate when using hyponitr. ac. vapors, Pollaci. xxiii, 249—for estimating tannin, Jean. xxv, 206—**TESTS**: Alfraise. xviii, 221; Filhol. xxvi, 356; Peloggio's electrolytic test not very delicate, Campani. xxi, 279; chlor. pallad. test only good in absence of sulphocy., Kern. xxiv, 219; sulphocy. ammon., Volhard. xxvii, 322; in cod-liver oil, Carls. xxx, 253, 4; detect. in bromine (water, ether), Hager. xix, 186; Jorisson (morph., chlorof.). xxix, 248; in soluble iodides (permang. pot.), Maier. xix, 188; (galvanic current). xix, 188; in kelp liquor, (permang. pot.), Sonstadt. xxi, 278; in presence of tannin (perchlor. iron), Tessier. xxi, 279; xxiii, 248—estimat. of water (bisulph. carb.). xxi, 279; Davies (mercury). xxviii, 225.
- in CALIFORNIA. xxvii, 591—NORWAY. xxviii, 224—PERU. xxiii, 246; xxvi, 355.
- Iodine CAREOLATE**, Holtz. xxvii, 122—Hager. xxv, 84.
- **CHLORIDES**, act. of water, Schützenberger; Bornemann. xxvi, 357.
- **PENTACHLORIDE**, existence doubted, Brenken. xxiv, 219.
- **TRICHLORIDE**, Christomanos. xxvi, 358.
- Iodinite**, California. xxvii, 591.
- Iodo-bromide of CALCIUM COMPD.**, Godeffroy. xxii, 55, 320.
- Iodoform**, administration. xxiii, 720—adult. Sørensen. xxiii, 517—contam. with iodate calc. xix, 344—deodorized, Hager. xxx, 349—odor largely due to amylic alc., Bell. xxx, 347—deodorized: xxviii, 280; tonka, Masetig. xxx, 349; thymol, Ruetz. xxx, 349, 616—deodor. of vessels (alc. sol. potassa), Wilder. xxii, 720—formation, Hager. xxx, 346—history, Wilder. xxiii, 721; xxiv, 291—**PREPARATION**: Bell (Filhol). xxx, 347; Bouchardat. xxiii, 718; Carstens (Wittstein). xix, 254; Cleary. xxiii, 721; Cornélis and Gille. xxiii, 722; Filhol. xxii, 719; Mayer. xxiii, 722; Mohr. xxiii, 721; Poulenc. xxiii, 722; Rother. xxiii, 722; xxx, 346; Serullas. xxiii, 721; Smith. xxiii, 722; Wilder (Bouchardat and Filhol). xxiii, 717; Wittstein. xxiii, 721—xxv, 276—solubility in alc., Candidus. xxx, 565; in benzin, essent. oils, Vulpius. xxx, 348; in ether, alc., glyc., fixed oils, Vulpius. xxvii, 410; in ether and kept in a red bottle, Odin and Lymarie. xxii, 239; in oil sweet almonds, McElhenie. xxiv, 291; solubil. in water, Schade-wald. xxx, 348—in solution (tinct. iod. and potash), Keyworth. xxvii, 92; xxviii, 59; tests: (heat and starch), Guyot. xxvi, 491; (resorcin) xxx, 347.
- Iodphosphonium**, Baeyer. xxi, 222.
- Iowa**, pharmacy law. xxviii, 579; xxx, 476, 486.
- Ioyotli**—*Thevetia ycotli*, Mexico. xxv, 27, 148.
- Ipe-assú** (=TOBACCO)—*Tecoma ipe*, Brazil. xxii, 115.
- Ipecac**, adult. of powd. xxiii, 177; xxix, 163; xxx, 576, 579—mineral adult. detect. by chlorof., Siebold. xxviii, 278; strengthened with tart. emet. xix, 335; suspicious price. xxiv, 394—drug market. xix, 396; xx, 127; xxi, 440; xxii, 640; xxv, 350; xxvi, 660; xxvii, 560—yield of emetia, Steward. xxv, 162. See also **EMETIA**—when introduced. xxvi, 848—cultivat. in E. India, not very encouraging, Clarke. xix, 283; in Sikkim, King. xxi, 230; xxiv, 145.
- fr. NEW GRANADA, Lefort. xix, 283.
- **STRIATED**, constituents, Attfield. xviii, 280.
- Ipomæa BRACHYPODA**, Mexico. xxvii, 157.
- **MURCOIDES**, Mexico. xxiv, 772.
- **NIL**, Kansas. xxix, 443.
- **PANDURATA**, constituents, Manz. xxx, 176—in Kansas. xxix, 443.
- **PES-CAPRÆ**, India, descript., Dymock. xxv, 145.
- **PURPUREA**, Kansas. xxix, 443.
- **SAGITTATA**, California. xix, 305.
- **SIMULANS**, Mexico. xix, 287.
- **TURPETHUM**, India, descript., Dymock. xxviii, 130.
- Iridaceæ**. xviii, 274; xix, 294; xxi, 209; xxiii, 136; xxiv, 124; xxv, 128; xxvi, 191; xxvii, 144; xxviii, 111; xxix, 129; xxx, 152—of California. xix, 307; Kansas. xxix, 446.
- Iridin** (eclectic), solubil., Parker. xxx, 128.
- Iridio-platinum**, advantages for standard weights. xxvii, 28; Matthey. xxvii, 376.
- Iridium**. xviii, 252; xxiii, 315.
- act. upon formic ac. and alc., Deville and Debray. xxiii, 317; of oxygen. xxvii, 374.
- **ALLOY**, Deville and Debray. xxiii, 315; xxvi, 266.
- **OXIDE**, best black paint upon glass and porcelain. xviii, 242.
- Iridol** (hydrocarbon fr. wood tar), Thenius. xxvi, 431.
- Iris DOUGLASIANA**; — **LONGIPETALA**; — **MACROSPHON**, California. xix, 307.
- **VERSICOLOR**, constituents of rhizome, Cressler. xxx, 152; Marquardt. xxv, 128—keep the powder, Jenks. xxx, 152.
- see **ORRIS**.

Irish moss, adult. (*Gigartina acicularis*), xxii, 96, 307—analysis, Church. xxv, 117.

Iron, see also **FERRUM**.

— xviii, 233: xix, 213; xxi, 299; xxii, 196; xxiii, 283; xxiv, 244; xxv, 257; xxvi, 393; xxvii, 347; xxviii, 241; xxix, 262; xxx, 295; in California. xxvii, 591.

— act. on nitric ac., Acworth and Armstrong. xxvi, 343—variable distribut. of sulph. and phosphorus in bar iron, Kern. xxvii, 348—brass-plated, Walenn. xix, 167—fancy coloring, Puscher. xix, 168—copper-plated, Walenn. xix, 167—by electrolysis (a compd. of hydrog. and iron), Klein. xix, 213—estimat. (gas process), Creuse. xxii, 439; in ores, Hartley. xxiii, 288; Oudemans. xviii, 234; in presence of phosph. ac., Pellet. xxvi, 395; Uelsmann. xxvi, 395; iodine process. xxii, 438; sesquioxide process. xxii, 437—absorbs hydrogen, Jacobs. xviii, 216—cemented to leather. xix, 175.

— **MAGNETIC**, proto-sesquioxide, Lepout. xviii, 234; Liebig-Wöhler. xviii, 234.

— **METEORIC**, fr. Greenland, Buchner. xxi, 300—ore, analysis (zinc powder), Brown. xxvii, 347—oxidation, causes, Calvert. xviii, 234.

— suitable for **PHARMACISTS**, Debrunner. xxvi, 393—Pittsburg market. xxi, 445—is as necessary to plants as to animals, Boussingault. xxi, 300.

— **PLATING** of copper, Boettger. xxvi, 394—powder, test for lead, Hager. xix, 213.

— **PREPARATIONS**, diffusive power, Attfield. xxviii, 242—proport. amount of metallic iron, Dambier. xxv, 259.

— **PROTO SALTS**, apparatus, Stock. xxvii, 348—oxidation, Buchanan. xxx, 295—of Ph. Brit. all contain ferric salt, Draper. xxvii, 349.

— **PURE**, prep., Mathiessen. xviii, 233.

— **REDUCED**: by carbonic oxide, Creuse. xxii, 446—by cyanogen, Maitre. xxii, 446—fr. oxal. iron. xxii, 446. See also **IRON BY HYDROGEN**, *infra*.

— preserved fr. **RUST**, Barff. xxv, 257—xix, 175.

— **ELECTRO-SILVERED**, Boettger. xxi, 195.

— **TASTELESS** compounds, Rother (inverse synthesis). xxiv, 245—Rutter (constitution). xxiii, 691; xxiv, 245—discussion. xxiii, 816.

— **TESTS**: salicylic acid, Vogel. xxiv, 324; limit of react. with tannin, sulphocy. pot., ferrocy. pot., Wagner. xxx, 286; logwood, Bellamy. xviii, 283; test paper, Mohr. xxii, 51—volatiliz. temp., Elsner. xxi, 299—wire generally cont. copper, Rother. xxiii, 502.

Iron ACETATE, scales. xxi, 359.

— **ACETO-NITRATE**, Williams. xxviii, 452.

— **ALBUMINATE**. xxvi, 28—variability in comp. unavoidable, Buchner. xxx, 450—prep., Dönitz. xxviii, 358; Dutch Pharm. Soc. xxx, 449—formation, Holdermann. xxvii, 535.

— **ALBUMINATE**, DRY, prep., Diehl. xxviii, 358—Merck. xxvi, 120.

— **ALBUMINATE**, SOLUTION, prep., Bernbeck; Friese; Kobigk. xxvi, 119.

— **AMIDO-SULPHONATE**, Berglund. xxvii, 332.

— and **AMMONIUM CITRATE**, diffusive power, Attfield. xxviii, 243—prep., Diehl. xix, 214; Dohme. xxviii, 455; Lloyd. xxvii, 741; Méhu. xxii, 256—pill excip. (manna), Fairthorne. xxx, 101—comparat. value of commercial, Umney. xxii, 214.

— and **AMMONIUM SULPHATE**, with 6 equ. water, Fleischer. xxi, 301—pill excip. (manna), Fairthorne. xxx, 101.

— and **AMMONIUM TARTRATE**, Méhu. xxii, 255.

— **ARSENIDE**, Deschamps. xxvii, 367.

— **BENZOATE**, best iron salt for cod liver oil, Gadin. xxi, 267—oxidizes very rapidly, Sestini. xix, 214—prep., Hager. xxvii, 463.

— and **BISMUTH CITRATE**, Rice. xxi, 148.

— **BOROCITRATES**, Scheibe. xxix, 321.

— **BOROTARTRATE**, ALBUMINATED, Pavesi. xxx, 451.

— **BROMIDE**, cost of home-made. xx, 206—normal, solution. xxv, 88—solut., Prince. xxiii, 75.

— **CARBONATE**, effervesc. gran. Skinner. xxv, 96. See also **SUBCARBONATE**.

— **CARBON. SACCHAR.**, see **FERRUM**.

— **CATALYTIC**, see **FERRUM**.

— **CHLORIDE (PER-)**, act. upon alkaloids, Godef-

Iron. (Continued.)

froy. xxvi, 559; upon resins, gum resins, balsams, Hirschsohn. xxvi, 455—diffusive power, Attfield. xxviii, 244—prep., Dohme. xxviii, 453—preserving prop., Almés. xxiv, 244—boil. with animal charc. reduc. to protochlor., Heintz. xxvi, 363.

— **CHLORIDE (PROTO-)** in analysis titrate with permang. pot., Follenius. xxi, 301—prep. Phar. Soc. Paris. xxvi, 142—solut. of definite strength, Dambier. xxv, 258—Gilmour. xxix, 262.

— **CHROMATE** as substit. for chr. lead, Kayser. xxv, 261.

— **CITRATE**, diffusive power, Attfield. xxviii, 243—fluid volume, Candidus. xxvii, 709—effervescent granules, Kossmann. xxx, 103—prep., Diehl. xix, 215.

— **CITRATE (ferrous)**, Méhu. xxii, 256.

— **CITRO PHOSPHATE**, Rother. xxv, 260.

— **DIALYZED** (also: LIQ. FERRI OXYCHLORATI;—SUBCHLORIDI;—PEROXYCHLORATI)—analysis, Trimble. xxvi, 116—as antidote to arsenic, Gibbons. xxvi, 118—Mattison. xxvi, 118—apparatus for continual dialysis, Lebaigue. xxvii, 90—color comparison of strength, Debrunner. xxvi, 117—examin. of commercial, Bothamley. xxvii, 87—constitut., Scheffer. xxvi, 114—discussion. xxv, 559—gelatinization, causes, Oltmans. xxv, 87—history, Diehl. xxv, 32; xxvi, 27; Maisch. xxvi, 112—precipit. by several salts. xxiv, 245—**PREPARATION**: xxv, 87; Berlandt (hog's bladder is quicker) xix, 213; Blair. xxvi, 114; Hager. xxv, 85; (without dialysis). xxv, 86; Hirsch. xxx, 87; Jackson (precip. dissolved in perchlor. iron and dialyzed). xxvii, 86; Klie (porcelain filt. basket). xxvii, 88; Lebaigue. xxvii, 20; Pharm. Soc. Paris. xxvi, 113; Pile (sod. carb. for am.). xxv, 452; Rother (without dialysis; carb. sod., mur. ac.). xxix, 79; Schacht. xxx, 87; Schneider (fr. cryst. ferric chlor.). xxvii, 86; Shuttleworth. xxvi, 114—standard, Maisch, Remington, Pile. xxv, 512—a valuable prep., Hager; Klamann. xxix, 78.

— **GAMBOGIATE**, Costelo. xxvii, 210.

— and **GOLD SULPHOCYANIDE**, Skey. xxiii, 267.

— by **HYDROGEN**, see also **IRON, REDUCED**, *supra*—what is understood by it? Creuse. xxii, 436—estimation (corros. subl., permang.), Miner. xxix, 262; (bromine, brom. pot.). Schacht. xxvi, 393; (copper sulph., sulph. ac.), Vulpius. xxviii, 241—examinat. of commercial: Carles. xxiii, 288; Creuse (fr. $\frac{1}{4}$ to 52 p. c. available). xxii, 435; xxiii, 289; Little (up to 90 p. c. oxide). xxi, 299; Rice (up to 30 p. c. carbon). xxi, 494—pill excipient (manna), Fairthorne. xxx, 101—pure, Crolas. xxiii, 289.

— **HYPOPHOSPHITE**, SOLUBLE (double salt with ammon.), Fairthorne. xxi, 146.

— **IODATE** of SESQUIOXIDE, Rabuteau (tasteless). xix, 214.

— **IODIDE**, decomp. by chlor. pot., Parker. xxviii, 223—cost of home-made. xx, 206—stable (albumen; mannite), Pavesi. xxvii, 311.

— **IODIDE** of SESQUIOXIDE, Cameron. xviii, 236—Rother. xxv, 259—existence denied by Tschirner. xxiii, 290.

— **IODIDE**, SACCHARATED, Jandous. xxx, 104.

— **IODIDE**, TASTELESS, Creuse. xxi, 443.

— **LACTATE**, in scales, Carbonell. xxv, 295—pill excipient (manna), Fairthorne. xxx, 101.

— **MANNATE**, Ghysen. xxi, 356.

— and **MERCURY SULPHOCY.**, Skey. xxiii, 267.

— **MILK** (fresh phosph. in water). xxv, 93.

— **NITRATE**, commercial, Leussen. xix, 215.

— **OLEATE**, Bernbeck. xxiv, 87—Wachsmuth. xxiv, 87—Wolff. xxvii, 430; xxx, 360.

— **OLEO-STEARATE**, Harlingen. xxii, 243.

— **OXALATE**, pyrophoric, prop., Boettger. xxvii, 470—prep., Bitheryst. xxvi, 549; Lagrange (ferrous). xxx, 309—temp. of reduct. by hydrogen, Müller. xix, 138.

— **OXIDE**, anhydrous solubil. in acids, Classen. xxvi, 396—hydrated, constit., Tommasi. xxviii, 242; frozen and thawed is insoluble in citric ac., Shuttleworth. xxvii, 350; prep., Markoe (fr. conc. solut.). xxviii, 459, 552; Lloyd (cold water and decantat.). xxvii, 740; (starting fr.

Iron. (Continued.)

- sulph. iron), Rother. xxi, 300—heated in hydrogen (products), Moisson. xxvi, 394; temperature of reduct. by hydrogen, Müller. xix, 138—act. of ozone, Mailfert. xxx, 259.
- OXIDE SACCHARATED, see FERRUM OXID. SACCHAR.
- PEPTONATE, AMMONIACAL, Jaillet and Quillart. xxx, 459.
- PHOSPHATE, act. of acet. ac. and boiling water, Sestini. xxiv, 246—constitut., Waine. xxvi, 396—pill excipient (manna), Fairthorne. xxx, 101—prep., Dohme. xxix, 434—soluble. xxv, 259; xxix, 515—Ph. Brit. improved, Price. xxiv, 245.
- and POTASSIUM ALBUMINATE, Lassa:gne. xxvi, 120.
- and POTASSIUM SULPHIDE, Preiss. xix, 215.
- and POTASSIUM TARTRATE, diffusive power, Attfield. xxviii, 244—fluid volume, Candidus. xxviii, 420—prep., Dohme. xxviii, 456; Lloyd. xxvii, 744.
- PYROPHOSPHATE, fluid volume, Candidus. xxviii, 420—prep., Caspari, Jr. xxviii, 460; Dohme. xxviii, 458; Langel. xxvi, 396.
- and QUINIA CITRATE, adult. (3 diff. commercial quotat.), Gerrard. xxi, 364, 490; (as low as 2 p. c.), Hogan. xxiii, 515; xix, 342; discussion: xxiii, 821; Bedford. xxi, 363, 489; Drueding. xxvi, 580; Holloway. xxiv, 408; xxvi, 574; Paul. xxv, 295; Zinn (cinchonina). xxii, 315; xxvi, 580—honest label. xxv, 342—diffusive power, Attfield. xxviii, 244—prep.: Dohme. xxviii, 456; Lloyd (temperat. to be kept). xxiv, 332; (saturat., particular). xxvii, 743; (ice cold solut.). xxix, 331; Umney. xxii, 256—estimat. of quinia, Fletcher. xxviii, 328; detect. of amorph. quinia, Vrij. xxix, 331—solut., Rother. xxi, 364.
- and QUINIA LACTATE, in scales, Carbonell. xxv, 295.
- RICINOLEATE, not constipating, Gifford. xxvi, 145.
- SACCHARATE, SOLUBLE, see FERRUM OXID. SACCHAR. SOLUB.
- SALICYLATE, White. xxviii, 311—solut., White. xxix, 315.
- SESQUIOXIDE, salts, decomp. of solut. by heat, Debray. xviii, 236—is harder than iron itself. xxv, 257—double salts with citr., tartr., oxal. ac. and alkal. are all green, Creuse. xxi, 301.
- and SODIUM PHOSPHOCITRATE, Martenson. xxv, 259.
- and SODIUM PYROPHOSPH. xix, 215.
- and STRYCHNIA CITRATE, soluble, Bartlett. xviii, 265.
- and STRYCHNIA LACTATE, scales, Carbonell. xxv, 295.
- SUBCARBONATE, commercial, quality, Bedford. xix, 528—color of old restored by heating, Bidwell. xxiii, 291.
- SUCCINATE, solub. in water, Young. xxix, 312.
- SUCRO-CARBONATE, see FERRUM CARBON. SACCH.
- SUGAR, see FERRUM OXID. SACCHAR. SOLUB.
- SULPHATE (ANHYDRO-), Bolas. xxii, 196.
- SULPHATE (OXY-), solution. xxvii, 91.
- SULPHATE (PER-), diffusive power, Attfield. xxvii, 244—crystallized, Meister. xxiv, 246—composition (fifteen different), Pickering. xxix, 263, 4.
- SULPHATE (PROTO-), anhydrous, Bolas. xxii, 196—diffusive power, Attfield. xxviii, 244—fluid volume, Candidus. xxvii, 709—preserved (paper), Johanson. xxix, 263; xxx, 295; (camphor), Wellborn. xviii, 233—soluble in alc., Candidus. xxx, 565.
- SULPHIDE (MONO-), Méhu. xxv, 258.
- SULPHIDE (SESQUI-), Phipson. xxii, 290.
- SULPHOCARBOLATE, Hustwick. xix, 251.
- SULPHOCHROMITE, Græger. xxx, 297.
- SULPHOCYANIDE, color destroyed by phosphates, corr. subl., oxal. ac., Dupré. xxiv, 233.
- TARTRATE, pyrophoric prop., Böttger. xxvii, 470—Méhu (ferrous). xxii, 254.
- TETRA-ACETO-DINITRATE, Williams. xxvii, 453.
- VALERIANATE, cost of home-made. xx, 206.

- Iron BARK TREE**—*Eucalyptus leucoxylon*, Queensland. xxi, 246, 8; xxiv, 740.
- VARNISH, Weisskopf. xviii, 212.
- weed—*Vernonia fasciculata*, Kansas. xxix, 443.
- wood—*Ostrya virginica*, Kansas. xxix, 444.
- “Irving's bill” (New York city). xix, 355, 373, 414; xx, 147.
- Irvingia BARTERI**, Africa, descript., Möller. xxix, 116.
- MALAYANA, India. xxiv, 165.
- Isé oshirir**—calomel, Japan. xxiv, 360.
- Isinglass**, history, account, etc., Simmonds. xxii, 171—solut. keeps on addit. of glycerin. xxi, 268—solub. of various kinds, Meyer. xxi, 268.
- NORTH AMERICAN;—BRAZILIAN;—CHINESE;—E. INDIAN. xxii, 172.
- JAPANESE, Draper. xxvi, 172; xxix, 118.
- RUSSIAN, Danilewsky. xxviii, 209; thick better than thin, Kattus. xxiii, 233; prep. xxii, 171.
- WEST INDIAN. xxii, 172.
- Isodulcite**. xxviii, 344.
- SODIUM. xxviii, 344.
- Isonandra GUITA**, see GUTTA PERCHA.
- Isopelletierina**, Tanret. xxviii, 342.
- Isopropyl**, SULPHOCYANIDE. xxiv, 296.
- ETHYLENE. xxvii, 414.
- Isopyrine** fr. *Isopyrum thalictroides*, Harsten. xxi, 233, 382.
- Isopyrum THALICTROIDES**, analysis of root, Harsten. xxi, 233.
- Isorcin**, fr. toluol-disulph. ac., Senhofer. xxi, 318.
- Isotropis STRIATA**, (Australia) poisonous. xxviii, 347.
- Ispaghul**, India. xxi, 213—descript. xxvi, 202. See also PLANTAGO ISPAGHUL.
- Isuretina**, isomeric with urea, Lossen and Schieferdecker. xxi, 385.
- Italy**, drugs, Centen. exhib. xxiv, 743—chemicals, Cent. exhib. xxiv, 796—pharmacy. xix, 317—pharm. prep., Cent. exhibit. xxiv, 813.
- Ito-kaja**—*Eulalia japonica*, Japan. xxviii, 104.
- Iva**—*Achillea moschata*, Switzerland. xix, 285; xxix, 158, which see.
- Ivain**, Planta-Reichenau. xix, 285; xxix, 158.
- Iva-ol**, Planta-Reichenau. xxix, 158.
- Ivory IMITATION**. xxvi, 157.
- dyed black. xxviii, 98—bleached. xix, 168—silvered. xix, 169.
- Ivy leaves**, glucoside, Vernet. xxiii, 448; xxix, 351.
- See also HEDERA HELIX.
- , CLIMBING—*Rhus radicans*;—GROUND—*Nepeta glechoma*, Kansas. xxix, 440, 6.

J.

- Jaborandi**, commercial varieties, Diehl. xxiii, 739; xxiv, 37; Peckolt. xxiv, 160—second alkaloid (jaborin), Harnack and Meyer. xxix, 347—history and analysis, Schær. xxiv, 162—constituents, Byasson. xxiii, 181; Gerrard. xxiv, 164; Hardy. xxiv, 164; xxv, 28; Miller and Rabuteau. xxviii, 167, 181—drug market. xxv, 352; xxvi, 661; xxviii, 373; xxix, 373—estimat. of alkal., Poehl. xxix, 194; extract. by benzol or chlorof. fr. alkal. aqu. sol., Dragendorff. xxvi, 86—microscopically, Stiles. xxv, 178—physiological prop., Merkel. xxvi, 164—root yields volat. oil and alkaloid, Peckolt. xxiv, 161.
- See also PILOCARPUS.
- BRAVO—*Piper Jaborandi*. xxiv, 162.
- COUTINHO—*Pilocarpus pinnatifolius*, Hardy. xxv, 175.
- ENCKIA GLAUCESCENS. xxiv, 162.
- ENCKIA RETICULATA. xxiv, 162.
- MANO—*Artanthe mollicoma*. xxiv, 162.
- DO MATO—*Serronia Jaborandi*. xxiv, 160.
- PARAGUAY—*Piper Jaborandi*. xxiii, 188, 741—analysis, Hardy. xxv, 178—physiolog. prop., Gubler. xxv, 178, 9.
- PERNAMBUCO, Diehl. xxiii, 783; Schær. xxiv, 162. See PILOCARPUS PINNATIFOLIUS.
- (of PISO)—*Monniera trifolia*. xxiv, 162.
- (of RIEDEL)—*Xanthoxylum elegans*. xxiv, 162.
- Jaborandina** (fr. *Piper jab.*), Parodi. xxiii, 188—Peckolt. xxiv, 161.

- Jaborin** is easily formed fr. pilocarpin, Harnack and Meyer. xxix, 348—physiol. act. corresponds to that of atropin, Harnack and Meyer. xxix, 347.
- Jacaránda OXYPHYLLA**, Brazil. xxiii, 120, 156; xxx, 177.
- **PAULISTANA**, Brazil. xxiii, 120, 156.
- **PROCERA**, Brazil, descript. xxviii, 132—analysis, Peckolt. xxx, 176.
- **SUBRHOMBEA**, Brazil. xxx, 177.
- Jackwood** = *Artocarpus integrifolia*, India. xxiv, 716.
- Jakosju** = *Perilla arguta*, Japan. xxviii, 128.
- Jalap**, account, Ellacomb. xxiii, 154—adulterat. (dried saccharine fruit), Squibb. xxx, 175; (extracted). xix, 335; xxi, 480, 1; xxx, 576, 9; mineral adult. of powd. detect. by chlorot., Sieboldt. xxviii, 278—drug market. xix, 397; xx, 127; xxii, 640; xxvii, 560—flowering in Paris, Baillon. xxii, 110—source, Baillon. (fr. *Exogon. jalapa*). xxii, 110; Lindley (fr. other *Convolvulus*). xxiii, 156—see also **EXOCONIUM PURGA**.
- in **BISCUITS**, Tambureau. xxiii, 116.
- **CULTIVAT. IN INDIA**. xxix, 148—**JAMAICA**. xxiv, 733; xxvi, 212—analysis, Holmes. xxx, 175—**TAMPICO**, Hanbury. xix, 287; analysis, Spingalis. xix, 288.
- **RESIN**, prop. and solubility, Köhler and Zwicke. xviii, 278—test for guaiac resin (copper and ammon.), Blacher. xviii, 278—yield, Keeler. xxviii, 130; Wrenn. xxx, 175.
- Jalapin**, constitution, Kingzett and Farries. xxvi, 211—act. of solvents and chemicals, Stevenson. xxviii, 129—prop. and solubility, Köhler and Zwicke. xviii, 278.
- Jalmaram** (incense), India. xxiv, 718.
- Jamaica**, drugs, Cent. exhibit. xxiv, 731—dyes, Cent. exhibit. xxiv, 736.
- Jambelon BARK** = *Syzygium jambolanum*. xxvi, 291.
- Jambool** = *Syzygium jambolanum*, India. xxv, 234.
- Jamieson, Thos. N.** xx, 79.
- Jamma intsiijn** = *Artemisia capillaris*, Japan. xxviii, 145.
- **mjogo** = *Alpinia japonica*, Japan. xxviii, 115.
- **sob** = *Ophiopogon japonicus*, Japan. xxviii, 204.
- Jangli mull** = *Blumea aurita*, India. xxvii, 179.
- Jano-frige** = *Ophiopogon japonicus*, Japan. xxviii, 204.
- Japaconin**, Wright. xxviii, 337.
- Japaconitin**, Wright. xxviii, 337; xxix, 342; xxx, 429.
- Japanese COMMISSION** of board of health, introduced (at Philadelphia meeting). xxiv, 593.
- Japan**, chemicals, Cent. exhib. xxiv, 798—drugs, Holmes. xxviii, 99; Schær. xxiii, 120; Cent. exhib. xxiv, 761—pharm. prep., Cent. exhib. xxiv, 812.
- **WAX**, see **WAX, JAPAN**.
- Japicanga** = *Smilax glauca*, Brazil. xxiii, 121.
- Jarámla** = *Phyllanthus niruri*, India. xxviii, 194.
- Jarbão** = *Stachytarpheta jamaicensis*, Brazil. xxii, 163.
- Jarrett, H. T.**, discussions: xxiii, 821—xxvii, 758, 760.
- Jarrinha** = *Aristolochia cymbifera*, Brazil. xxiii, 121.
- Jasminaceae**. xxiii, 150; xxvii, 162.
- Jasmine**, cultivat. in Australia. xxviii, 100—in France. xxiv, 823; xxvii, 382.
- Jasminum BETCHEI**, fr. Samoa, descript., Müller. xxx, 170.
- Jatamasi (-MANSI)** = *Nardostachys Jatamansi*, India. xxiv, 724; xxvii, 180.
- Jatropha CURCAS**, India. xxiv, 723—descript., Dymock. xxv, 226—juice as hæmostatic. xxiii, 120.
- **GLANDULIFERA**, India, descript., Dymock. xxv, 226.
- **NANA**, India, descript., Dymock. xxv, 226.
- spec., India yield a green dye. xxiv, 718.
- Javanina**, fr. Java calisaya, Hesse. xxvi, 569.
- Jawasa** = *Alhagi maurorum*, India. xxvii, 257.
- Jawishir**—gum-resin of *Ferula galbaniflua*. xxvii, 193.
- Jawrang** = *Ophiopogon Japonicus*, Japan. xxviii, 204.
- Jefferson, Chas. L.** xix, 82.
- Jelly, COD-LIVER OIL**, Agnew. xxv, 92—Fairthorne. xxx, 98.
- , **GLYCERIN** (=transparent soap). xxvi, 152; xxvii, 68—opaque. xxii, 69—for microscopists, Kaiser. xxix, 111.
- Jervia**, first called: barytin by Simon. xxvi, 592—(of Mitchell) is viridia (of Bullock) Wood. xxii, 418—prop., Bullock. xxiv, 361, 3—prep., Mitchell. xxii, 99, 405, 9, 413; Wormley. xxiv, 356, 8—fr. *Veratrum lobelianum*, Tobien. xxvi, 592, 3.
- **MURIATE**; — **NITRATE**; — **SULPHATE**, Bullock. xxiv, 359—363.
- Jewelweed**—*Impatiens pallida*, Kansas. xxix, 445.
- Jessamine, YELLOW**, see **GELSEMIUM SEMPER-VIRENS**.
- see also **JASMINE**.
- Jhurum** = *Morinda citrifolia*, India. xxiv, 717.
- Jicama** = *Dolichos tuberosa*, Mexico. xxiv, 776.
- Jintiyana**, India, = Europ. gentian. xxviii, 133.
- Jobst**, exhibit. at Centennial. xxiv, 790.
- Johannesia princeps**, Brazil. xxviii, 267; xxx, 250.
- Joints**, tightened by cellulose rings. xxvii, 56.
- Jones, Eduard C.**, cinnamon water. xxiv, 485.
- Jonquille**, cult. in France. xxiv, 823; xxvii, 383.
- Journals, EUROPEAN**, a definite sum appropriated. xviii, 110—disposition, Maisch. xxvii, 776.
- Journal on the PROGRESS of PHARMACY**, recommended by Sander. xx, 41.
- Joyote** = *Thevetia yccotli*, Mexico. xxv, 148.
- Jubeba** = *Solanum paniculatum*, Brazil. xxvi, 204.
- Judas' Ear** = *Hirneola auriculæ Judæ*, New Zealand. xxiv, 737.
- Judge, J. F.**, fluid extract sarsaparilla, deposit and menstruum. xxi, 596—keeping herbs. xix, 123—revision of the pharmacopœia. xxiv, 636, 642—sarsaparilla preparat., infl. of heat. xxi, 595—suppositories. xxii, 501, 2.
- discussions: xix, 123; xx, 69, 70, 71, 87; xxii, 501, 502, 549; xxiv, 573, 574, 576, 617, 636, 642, 643, 667, 671, 676, 677, 678, 682; xxvii, 759; xxix, 493.
- Juglandaceae**. xix, 293; xxii, 158; xxiv, 197; of California. xix, 306; Kansas. xxix, 446.
- Juglans CINEREA**, analysis of bark, Dawson. xxii, 158—see also **BUTTERNUT**.
- **REGIA**, leaves in diphtheria, Curtis. xxx, 246—Kansas. xxix, 446—leaves liable to deteriorate, Goværtz. xxviii, 190. See also **WALNUT**.
- **RUPESTRIS**, California. xix, 306.
- Juices**, preserved, Champion. xxx, 111.
- , **FRUIT**, prep., Parkinson. xxx, 110.
- **BILBERRY**, red, detect. of cherry juice, Mylius. xxx, 111.
- **CHERRY**, test, Mylius. xxx, 111.
- vegetable, **CHINESE**. xxii, 33.
- Ju-ka** = isinglass, China. xxi, 172.
- Jumbaba** = a spec. of cactus, Brazil. xxvi, 205.
- Jungli Erendi** = *Jatropha glandulifera*, India. xxv, 226.
- **mudrika** = capsules of *Papaver rhœas*, India. xxvi, 162.
- Juniper berries**, analysis, Donath. xxii, 163—drug market. xix, 397; xx, 121; xxi, 435.
- , **CYPRESS**, = *Juniperus phœnicia*, Greece. xxx, 251.
- Juniperus CALIFORNICA** and **UTAHENSIS**, California. xxvii, 280.
- **OCCIDENTALIS**, California. xxvii, 280.
- **PACHYPHLOEA**, Arizona. xxvii, 280.
- **PHœNICIA**, Greece. xxx, 251.
- **VIRGINIANA**, Kansas. xxix, 443.
- Junquillo**, Arg. Republ. xxiv, 762.
- Jupeba** = *Solanum paniculatum*, Brazil. xxvi, 204.
- Jurubeba** (-peba) = *Solanum paniculatum*, Brazil. xxvi, 204.
- Jurubebin**, Greene. xxvi, 205.
- Justicia RCBOLIUM**, India, descript., Dymock. xxviii, 125—**GENDARUSSA**, India, descript., Dymock. xxvi, 163.
- Jute**, account. xxviii, 89.
- **CARBOLIZED**, Kuster; Münnich. xxviii, 89.

K.

- Kabar** = rootbark of *Capparis spinosa*, India. xxvi, 165.
- Kachnar** = bark of *Bauhinia variegata*, India. xxvi, 166.

- Kackels** — *Oldenlandia globosa*. xxvii, 182.
Kadic pan (PANDANI) — rhizome of *Polypodium quercifolium*, India. xxvi, 158.
Kadsura CHINENSIS, China. xxiv, 757.
Kaduk-kai — fruit of *Terminalia chebula*, India. xxvii, 232.
Kæmpferia GALANGA. xxx, 447. See also GALANGAL.
Kæmpferid, Jahns. xxx, 447.
Kaf-i-maryam — *Anastatica hierochantica*, India. xxvi, 165.
Kah — flowers, Japanese. xxviii, 99.
Kai — *Dioscorea quinqueloba*, Japan. xxviii, 110.
Kai-meu-how — *Calophyllum inophyllum*, Cochin China. xxvi, 256.
Kainite, Stassfurt. xxii, 186.
Kaiphal — *Myrica sapida*, India. xxviii, 197.
Kaissopyta — pulp of apricot, Orient. xxiv, 188.
Kaja — *Eulalia japonica*, Japan. xxviii, 104.
Kajalee — *Clitoria ternata*, India. xxv, 209.
Kajra — *Strychnos nux vomica*, India. xxv, 150.
 — CHE LACOR — wood of *strychnos nux vomica*, India. xxv, 150.
Kaki, see DIOSPYROS KAKI.
Kakowma G'za — *Coptis anemonefolia*, Japan. xxviii, 164.
Kakrasinghee — galls of *Rhus succedanea*, India. xxiv, 194; xxx, 247.
Kalaka — *Carissa corundas*, India. xxviii, 140.
Kala-khajur — fruit of *Melia superba*, India. xxvi, 159.
Kala koora — *Wrightia tinctoria*, India. xxv, 150.
Kala-nagkesur — fruit of *Cinnamomum Loureiro*, India. xxvi, 163.
Kalanchoe PINNATA, India, *descript.*, Dymock. xxv, 196.
Kala-til — red-seeded sesamum, India. xxiv, 721.
Kala-teel — oil of *Guizouia oleifera*, India. xxvii, 179.
Kali-jeera (a spice), India. xxvi, 721.
 — **kasondi** — *Cassia sophora*, India. xxvi, 166.
 — **musli** — *Curculigo uncifolia*, India. xxix, 128.
Kalingar — seeds of *Citrullus vulgaris*, India. xxvii, 229.
Kali oleinicum — *Sapo viridis*, xxi, 606.
Kali, see also POTASSA.
Kal kasonda — *Cassia sophora*, India. xxvi, 166.
Kallurivi — *Ammania vesicatoria*, India. xxvii, 237.
Kalmia LATIFOLIA, constituents (cont. arbutin), Kennedy. xxiii, 164 — *microscop. struct.* of leaves, Paschke. xxx, 188.
Kalsunda — *Barleria prionitis*, India. xxviii, 124.
Kalu safed — copperas, India. xxiv, 715.
Kamachi — *Solanum nigrum*, India. xxviii, 120.
Kamai — *Weinmannia racemosa*, New Zealand. xxiv, 737.
Kamal — flowers of *Nelumbium speciosum*, India. xxvi, 164.
Kamala, adult. (yields 54 p. c. ashes against 5 p. c.), Kemper. xxi, 260, 481; (20 p. c. sand), Schneider. xxiii, 223 — presence of rottlerin confirmed, Groves. xxi, 259 — sp. gr., Hager. xxvii, 424.
Kamuni — *Solanum nigrum*, India. xxviii, 120.
Kanapscha — *Salvia sclarea*, Turkestan. xxi, 220.
Kanawha SALT contain. with 3 p. c. bar. chlor., Scheffer. xxiii, 518.
Kanchan — bark of *Bauhinia variegata*, India. xxvi, 166.
Kandaharee Hing — Bombay asafetida, *descript.* xxiii, 178 — fr. *Narthex asafetida*, India, *descript.*, Dymock. xxvi, 160.
Kandan-kattiri — *Solanum Jacquini*, India. xxviii, 120.
Kangika — rice vinegar, India. xxvi, 165.
Kan-ko — calomel, Japan. xxiv, 261.
Kanocha — seeds of *Phyllanthus madraspatensis*, India. xxvi, 159.
Kanphootee — *Gynandropsis pentaphylla*; and *Polansia icosandra*, India. xxv, 195 — also *Cardiospermum halicacalum*, India. xxvi, 166.
Kansas, medicinal flora, Brown. xxix, 438 — *pharmac. law.* xxix, 375.
Kanta-katiri — *Solanum Jacquini*, India. xxviii, 120.
Kanturiyum — *Erythraea centaurium*, or *Ophelia multiflora*, India, *descript.*, Dymock. xxviii, 134.
Kaolin for clarifying wines, Hoffmann. xxii, 195.
Kapur bhendi — *Naregamia atata*, India. xxvi, 158.
Karafs — *Apium graveolens*, Persia. xxvii, 192.
Karai — gum of *Sterculia urens*, India. xxvi, 161.
Karaka — nut fr. *Corynocarpus laevigata*. xxi, 263.
Karakin fr. *Corynocarpus laevig.*, prop., Skey. xxi, 263.
Kara kurwa — *Hymenodictyon excelsum*, India. xxv, 168.
Karalee — gum of *Sterculia urens*, India. xxvi, 161.
Karamcha — *Carissa corundas*, India. xxviii, 140.
Kara momu — *Prunus armeniaca*, Japan. xxviii, 179.
Karasubishaku — *Pinellia tuberifera*, Japan. xxviii, 102.
Karasuno seni — *Dioscorea quinqueloba*, Japan. xxviii, 111.
Karatata-banna-gees — *Citrus bigaradia* var. *trifolia*, Japan. xxviii, 169.
Karela (KARLA) — fruit of *Momordica charantia*, India. xxviii, 228.
Kari — leaves of *Clerodendron infortunatum*, India. xxvi, 162.
Karipak — *Bergera* (Murraya) *Köningii*, India. xxv, 185.
Karomera — Calomel, Japan. xxiv, 261.
Karonda (KAROUNDA) — *Carissa Corundas*, India. xxviii, 140.
Karonta — *Pedaliium murex*, India. xxv, 146.
Karos — Caraway, Greece. xxv, 170.
Karpushpoo — *Zingibar Cassumunar*, India. xxviii, 114.
Karree — *Sterculia urens*, India. xxiv, 718.
Karoo chuntz — *Corchorus trilocularis*, India. xxvi, 163.
Karuntaka — *Barleria prionitis*, India. xxviii, 124.
Karwa-bobla — fruit of *Lagenaria vulgaris* var. *amara*, India. xxvii, 330.
Karwand Karinda — *Carissa corundas*, India. xxviii, 140.
Karwa-wagutti — root of *Paramignya monophylla*, India. xxvi, 160.
Karweo-tumbi — fruit of *Lagenaria vulgaris* var. *amara*, India. xxvii, 230.
Kash — *Poa cynosuroides*, India. xxvi, 161.
Kas-hi-yu, Japan, *descript.*, Holmes. xxviii, 204.
Kasondi — *Cassia occidentalis*, India. xxvi, 166.
Kassai-Bij — *Coix lachryma*, India. xxv, 124.
Kassuda-fauna-dakka — *Dioscorea quinqueloba*, Japan. xxviii, 111.
Kât — *Catha edulis*, Arabia. xxv, 156.
Katâi — *Solanum Jacquini*, India. xxviii, 120.
Katapatia — wine lees, Greece. xxvi, 546; argols. xxix, 317.
Kateri-indrayan — fruit of *Ecbalium elaterium*, India. xxvii, 229.
Katha-ul-himar — fruit of *Ecbalium elaterium*, Arabia. xxvii, 230.
Katphala — *Myrica sapida*, India. xxviii, 197.
Katree — *Vitex negundo*, India. xxv, 142.
Katsareya — *Barleria prionitis*, India. xxviii, 124.
Katschul — zeodary, Turkestan. xxi, 209.
Katsuyama-bushi — a spec. of *Aconite*, Japan. *descript.*, Langgaard. xxix, 178, 182.
Kattimandu — *Euphorbia cattemandu*, India. xxiv, 719.
Katu-tumbi — fruit of *Lagenaria vulgaris* var. *amara*, India. xxvii, 230.
Kauri gum, Australia, account, Muir. xxiii, 228 — solubility in oil eucalyptus, Osborne. xxvii, 234.
Kava-Kava, *descript.* xxv, 222 — analysis, Cuzent. xxv, 27, 224 — drug market. xxv, 352; xxviii, 373.
Kavahin, Cuzent. xxv, 27, 224.
Kavlee — *Gymnea sylvestris*, India. xxv, 151.
Kawa hasikami — *Evodia rutæcarpa*, Japan. xxviii, 168.
Kawa hone — *Nuphar japonica*, Japan. xxviii, 115.
Kawa Kawa, see KAVA KAVA.
Kawale che dole — *Bryonia laciniata*, India. xxv, 200.

- Kawara Imogi** = *Artemisia capillaris*, Japan. xxviii, 145.
 — **saiko** = *Anemone cernua*, Japan. xxviii, 163.
 — **yomogi** = *Artemisia capillaris*, Japan. xxviii, 145.
Kaw-sung = a spec. of valerian, China. xxii, 120.
Kawa-sob (sobu) = *Acorus spurius*, Japan. xxviii, 103.
Kee-kock = *Citrus fusca*, Japan. xxviii, 169.
Kee-ramar = *Aristolochia bracteata*, India. xxv, 131.
Keerdamana = fruit of *Conium maculatum*, India. xxvi, 162.
Keersal = impure catechu, India. xxv, 213.
Keffer, M. P., report on the New Orleans market. xxi, 448.
Kei-fun = Calomel, Japan. xxiv, 260.
Keiley, A. M. Address of welcome, at Richmond, Va. xxi, 26.
Kei-ning-soh = *Digenia simplex*, Japan. xxviii, 101.
Kekko = *Platycodon grandiflorum*, Japan. xxviii, 142.
Kekuna = *Aleuritis triloba*, Jamaica. xxiv, 733.
Kelley, E. F. xviii, 52, 53.
Kellog's RED DROPS, analysis, Pierron. xxiv, 421.
Kelp, ought to be burned without previous drying, else it loses iodine. xxvii, 308.
Ke-mundo = *Asparagus lucidus*, Japan. xxviii, 109.
Kenawha, see KANAWHA.
Kene-ming-taze = *Cassia tora*, China. xxviii, 186.
Kennedy, G. W. *Aspidium marginale*. xxviii, 462
 — **coca**. xxvi, 764, 880 — **extract aloes**. xxv, 402
 — **senega**. xxvii, 721 — *Frasera Walteri*. xxi, 635
 — **glycerin**, hygroscopicity. xxvii, 724 — **guarana**. xxiv, 491; xxvi, 900 — **jaborandi**. xxix, 421 — **mercurial ointment**. xxx, 551, 624, 5 — **physostigma**. xxiii, 602 — **pilocarpina**. xxix, 421 — **Rhamnus purshiana**. xxviii, 431 — **report of executive committee**. xxiii, 761; xxiv, 581; xxv, 485; xxvi, 856; xxvii, 764; xxviii, 516 — **suppositories**. xxii, 383, 501, 2 — **tinct. ferri chloridi**. xxiv, 675.
 — **discussions**: xxii, 501, 502, 503, 523, 525; xxiii, 754, 757, 776, 788, 789, 797, 820, 830, 831, 835, 838; xxiv, 570, 613, 625, 638, 665, 675, 676, 687; xxv, 515, 523, 536, 549, 555, 561, 563; xxvi, 880, 881, 884, 888, 891, 893, 894, 900, 903, 905; xxvii, 758, 761, 806; xxviii, 511, 537, 572; xxix, 505, 511, 520; xxx, 623, 624, 625, 936, 657, 660.
Kentucky, pharmacy law. xxii, 330, 335; xxiv, 605; xxv, 380, 3; xxx, 477, 490.
Kermes minerale, variable composit., Kayser. xxix, 275 — **prep.**, Terreil. xxiii, 306; (is incorrect, Weppen. xxiv, 260.)
Kermous-el-nesara = *Cactus opuntia*, Algeria. xxii, 145.
Kerosene, in California. xxvii, 631.
Kesso = *Patrinia scabiosifolia*, Japan. xxviii, 150.
Ketella fr. Java. xxiv, 742.
Kettell, G. P. xxiii, 792.
Ketz-may-see = *Cassia tora*, Japan. xxviii, 186.
Ketzumei = *Cassia tora*, Japan. xxviii, 186.
Khabazee = fruit of *Malva sylvestris*, India. xxvi, 162.
Khaira = *Sterculia urens*, India. xxix, 718.
Khakshir = seeds of *Sisymbrium Iris*, India. xxvi, 163.
Khandesh = *Boswellia serrata*, India. xxv, 218.
Khaya SENEGALENSIS, yields Senegal gum xxv, 212.
Kheir = *Acacia catechu*, India. xxiv, 718; xxv, 213.
Khilaf-ul-Balki (Arabic) = *Salix caprea*, India. xxviii, 198.
Khiyar-i-khar (Persian) = fruit of *Echaliun elaterium*. xxvii, 290.
Khobaizeh = *Malva parviflora* and *Lavatera hispidia*, Morocco. xxiii, 191.
Khoheil = Dragon's blood, Socotra. xxviii, 108.
Khorasane ajwan = seeds of *Hyoscyamus niger*, India. xxvi, 161.
Khorasane agwain = *Hyoscyamus albus*, India. xxix, 138.
Khorasain owa (OMAN) = *Hyoscyamus albus*, India. xxix, 138.
Khusum = *Schleichera trijuga*, India. xxviii, 195.
Kicteera = *Cochlospermum gossypium*, India. xxiv, 718.
Kidney plant (wort) = *Baccharis pilularis*, California. xxvi, 698; xxvii, 610.
Kiefer, ITALIENISCHE; — **STRAND** = *Pinus maritima*. xxvi, 316, 7 — **ZURBEL** = *Pinus cembra*. xxvi, 322.
Kieu-ess = *Allium senescens*, Japan. xxviii, 109.
Kif = a spicy mixture cont. *Cannabis indica*, Algeria. xxv, 328.
Kih-hang = *Platycodon grandiflorum*, China. xxviii, 142.
Kikal = *Cassia occidentalis*, India. xxvi, 166.
Ki-kohu = fruit of *Citrus bigaradia*, var. *trifolia*, Japan. xxviii, 169.
Kikuba-dokoro = *Dioscorea quinqueloba*, Japan. xxviii, 111.
Ki-kyô = *Platycodon grandiflorum*, Japan. xxviii, 142.
Kimuski = a spec. of *Canna*, India. xxv, 129.
King, Jas. T., report of committee on exhibit. xxii, 322.
King-ki-o = leaves of *Malva sylvestris*, Japan. xxviii, 168.
Kings County (N. Y.), pharmacy law. xxvii, 659, 663.
Kinipi, Arg. Republ. xxiv, 765.
Kin-kee = root of *Malva sylvestris*, Japan. xxviii, 168.
Kino, adult. of powd. xxx, 576.
 — **MALABAR**, cont. **kino**, **Etti**. xxvii, 249; — **PULAS** = *Butea frondosa*, India. xxiv, 718.
Kino fr. **malabar kino**, **Etti**. xxvii, 249; xxviii, 349.
Kiou-tzé = yeast, China. xxii, 33.
Kirakoo = *Platycodon grandiflorum*, Japan. xxviii, 142.
Kirgamellia ELEGANS, Mauritius. xxiv, 741.
Kiri-hinau = *Elæocarpus dentatus*, New Zealand. xxiv, 737.
Kiri-toa-toa = *Phyllocladus trichomanoides*, New Zealand. xxiv, 737.
Kirjo = *Platycodon grandiflorum*, Japan. xxviii, 142.
Kirkundi = *Jatropha nana*, India. xxv, 226.
Kirmali = seeds of *Strychnos potatorum*, India. xxviii, 136.
Kishmiri banafsha = rhizome of a spec. of *Viola*, India. xxvi, 162.
Kishmish-i-kawaliyan (Persian) = berries of a spec. of *Viscum*, India, **descript.**, Dymock. xxviii, 159.
Kisil-jousuruk = *Gratiola officinalis*, Turkestan. xxi, 214.
Kissos = Ivy, Greece. xxv, 134.
Kiueh-ming-taze = *Cassia tora*, China. xxviii, 186.
Kizhkay-nelli = *Phyllanthus niruri*, India. xxviii, 194.
Kjoo = *Prunus armeniaca*; Japan. xxviii, 179.
Kleinia PTERONEURA, Morocco. xxiii, 167.
Klie, G. H. Chas. xxx, 648.
Kline, M. N., discussions. xxx, 624, 626, 627, 636.
Knidi = *Urtica pilulifera*, Greece. xxx, 246.
Knightia EXCELSA, New Zealand. xxiv, 737.
Knotgrass = *Polygonum aviculare*, Kansas xxix, 449 — **uses in China**. xxiv, 748.
 — See also POLYGONUM AVICULARE.
Koji = fermenting body for making **saki**, Japan. xxvii, 403; xxviii, 363; xxx, 455.
Ko-kits = *Citrus bigaradia*, var. *trifolia*, Japan. xxviii, 169.
Koku-bushi = a spec. of *aconite*, Japan. xxix, 173.
Kokum = *Garcinia indica*, **descript.**, Dymock. xxvi, 165.
 — **ola**. *Cola acuminata*, Jamaica. xxiv, 735.
 — See also COLA.
Kole-zan = *Vitis latifolia*, India. xxv, 187.
Kolki = *Acalypha indica*, India. xxviii, 142.
Kolla SICKNESS, Abyssinia. xxvi, 229.
Komri = *Poinciana pulcherrima*, India. xxvi, 166.
Koosso. See KOUSSO.
Koot = *Aplotaxis costus*, India. xxvi, 161 — *Aplotaxis lappa*, Kashmere. xxi, 224.
Koshiou-you = *Evodia glauca*, Japan. xxviii, 168.
Kosht (KOST) = *Aplotaxis auriculata*, Persia. xxvi, 225.

- Koshtam**—*Aplotaxis auriculata*, India. xxvi, 225.
Kosin. See **KOUSSIN**.
Kossa—extract of betel nut, India. xxiii, 128.
Kossala, Abyssinia, analysis of seeds. xxvi, 171.
Kotree-see—*Coriandrum sativum*, Japan. xxviii, 159.
Kotukutuku—*Fuchsia excorticata*, New Zealand. xxiv, 737.
Kouma-tori-bokondsi—*Arctium Lappa*, Japan. xxviii, 145.
Koymyss, prep. xxix, 362—*Pigatty*. xxx, 130—*Power*. xxix, 361—*Truckenmiller*. xxviii, 360—*Wilckens*. xxiii, 115—*Wolff*. xxviii, 359—*Russian method*, George. xxi, 200; *Haurowitz*. xxiii, 115—*Swiss*, *Suter-Næff*. xxi, 201—*EXTRACT*, *Nessler*. xxiii, 115.
Koundal—*Trichosanthes palmata*, India. xxv, 201.
Koussou ought to be "Koso," *Muntzinger*. xxiii, 210—*administrat.* (percol. with hot castor oil), *Corre*. xxviii, 180—*adult.* of powd. xxx, 576—*descript.* of plant. xxvi, 283—*koussin* is not the active principle, *Arena*. xxviii, 180—*powder* loses its activity, *Arena*. xviii, 181.
 — See also **BRAYERA ANTHELMINTICA**.
Koussin not the active principle, *Arena*. xxviii, 180—*prep.*, *Bedall*. xxi, 391—*prop.*, *Buchheim*. xxiii, 210; *Buri*, *Flückiger*. xxiii, 454.
Kowtee—*Hydrocarpus inebrians*, India. xxv, 195.
Krameria ARGENTEA (Brazil, Para, Ceara rhatany), *Flückiger*. xxiv, 179.
 — **TOMENTOSA** (*Savanilla rhatany*), *Rhatania granatensis*, *Flückiger*. xxiv, 179.
 — **TRIANDRA**. See **RHATANY**.
Krantzite, deposit in New Jersey, *Goldsmith*. xxviii, 272.
Kras-no-Fisiaku = *Pinellia tuberifera*, Japan. xxviii, 102.
Krasopsoma (bread and wine poultice), Greece. xxvi, 389.
Kreatin found in milk, *Commaille*. xviii, 268—*test*, (nitro prusside sod.), *Weyl*. xxvii, 543.
Kreatinin from whey, *Commaille*. xviii, 267—*test*, (nitro prusside sod.), *Weyl*. xxvii, 543.
Kreppee, (Bitter-oil nuts), Gold Coast, Africa. xxiv, 741.
Kryo hydrate, *Guthrie*. xxvii, 406.
Kryolith. xxiv, 782. See also **CRYOLITH**.
Krischnachoor—*Poinciana pulcherrima*, India. xxvi, 166.
Kuchila-lata—*Strychnos colubrina*, India. xxviii, 136.
Кухля, N. F. xxvi, 899, 913.
Kuhnia RUPATORIODES, Kansas. xxix, 442.
Kuh-shing, Japan, *descript.*, *Holmes*. xxviii, 204.
Kukarwel—*Luffa echinata*, India. xxvii, 228.
Kumbha kummo—*Careya arborea*, India. xxvii, 236.
Kumiss (-mys). See **KOUMYSS**.
Kummer kas—root of *Amorphophallus sylvaticus*, India. xxv, 122.
Kung—root, Japanese. xxviii, 99.
Kuppai-meni—*Acalypha indica*, India. xxviii, 142.
Kuppi—*Acalypha indica*, India. xxviii, 142.
Kurchi (-RE) BARK—*Wrightia antidysenterica*, India. xxx, 182.
Kurchicene (-conessine of Shenstone), fr. *Wrightia antidysenterica*, *Ram Chandra*. xxx, 181.
Kure-no-nomo—*Foeniculum vulgare*, Japan. xxviii, 159.
Kurki, root of *Asclepias curassavica*, India. xxvi, 163.
Kurolokino, Abyssinia, rheumatism remedy, *Schroff*. xxii, 55.
Kurpa—*Portulaca quadrifida*, India. xxvi, 165.
Kurroo-khajar—fruit of *Melia superba*, India. xxvi, 159.
Kursing—tar fr. *Bignonia xylocarpa*, India. xxvi, 159.
Kurwa, nimb—*Bergera (Murraya) Königii*, India. xxv, 185.
Kusa-sugi-kodzura—*Asparagus lucidus*, Japan. xxviii, 109.
Kusa-uzu—a spec. of aconite, Japan. xxix, 173, 182—*descript.*, *Langgaard*. xxix, 180.
Kusin—*Sophora heptaphylla*, Japan. xxviii, 204.
Kut—*Aplotaxis auriculata*, India;—**KUT SHIRIN**—young root;—**KUT TULKH**—old root. xxvi, 225.
Kuteera gnm, fr. *Sterculia urens*, India. xxiv, 718.
Kuts jinos—*Gardenia florida*, Japan. xxviii, 157.
Kut mitha—false costus, India. xxvi, 226.
Kwang-muh-hiang—*Aplotaxis auriculata*, China. xxvi, 225.
Kyheri—a source of curare poison, Brazil. xxvi, 215.
Kyminon—Caraway, Greece. xxv, 170.
- ### L.
- Labdanistirion**, Greece. xxiv, 182; xxvii, 224, 5.
Labdanum, adult. (oliban., mastic), *Landerer*. xxiv, 182, 405—*collect.* in Creta. xxiv, 182; xxvii, 224.
 — **E BARBA**, Greece. xxiv, 182; xxvii, 225.
Labels, GUMMING, Facilides. xix, 174.
 — for SHOP bottles, *Triest*. xxix, 56.
 — on TIN (four methods). xxx, 57.
 — **VARNISH**, *Danckwort*. xxii, 54; *Kirsten*. xxix, 56.
Labiatae. xviii, 277; xix, 291; xxi, 219; xxiii, 150; xxiv, 133; xxv, 142; xxvi, 208; xxvii, 163; xxviii, 127; xxix, 141; xxx, 171; of California. xix, 304; Kansas. xxix, 446; Mexico. xxiv, 772.
Laboratory, APPARATUS, *Corder*. xxv, 46—*Schacht*. xxvi, 79.
 — **TRAINING** necessary, *Prescott*. xix, 428.
Laburnum, medicinal uses, *Hardwicke*. xxiv, 193.
Lac dye, India. xxviii, 196.
Lac FERRI, freshly precip. phosph. iron in water. xxv, 93—*Dutch Phar. Soc.* xxx, 100.
 — **IODATUM**, *Dutch Phar. Soc.* xxx, 100.
 — **OSSIUM**, *Dutch Phar. Soc.* xxx, 100.
 — **SULPHURIS** and precipit. sulph., *Crofts*. xxvi, 345. See also **SULPHUR, PRECIPITATED**.
 — See also **SHELLAC**.
Lachnanthes TINCTORIA, Kansas. xxix, 445.
Lachryma ABIEGNA (ABIETIS)—*Strassburg turpentine*. xxvi, 313.
 — **TURIONUM ABIETIS**, Greece. xxix, 236.
Lacquer, colorless. xix, 174—*for engraving*. xix, 174. See also **VARNISH**.
Lact-albumen, *Commaille*. xxiii, 463.
Lactaris DELICIOSUS, analysis, *Harsten*. xxiii, 124.
Lactarius RUFUS;—**SUBDULCIS**;—**TORMINOSUS**, cont. oxalic ac., *Hamlet and Plowright*. xxvi, 178.
Lactometer, *Horsley*. xxiii, 235—*Soxhlet*. xxix, 360. See also **LACTOSCOPE**.
Lactopeptin, cont. neither diastase nor pancreatin, *Scheffer*. xxiv, 546—*discussion*. xxiv, 671.
Lactoprotein, *Commaille*. xxiii, 463.
Lactoscope, *Feser's* (by degrees of opacity), *Huber*. xxvi, 628.
Lactose and sugar, distinction, *Campani*. xxii, 248.
 — See also **SUGAR OF MILK**.
Lactuca ALTISSIMA in France. xxv, 155.
 — **CANADENSIS**. xxviii, 145.
 — **ELONGATA**, Kansas. xxix, 442.
 — **SATIVA**, analysis, *Church*. xxv, 155.
 — **VIROSA**, cult., England, *Fairgrieve*. xxii, 118—in Lincolnshire, *Holmes*. xxx, 190.
Lactucarium, drug market. xxviii, 373; xxix, 373—*fluid extr.*, *Lemberger* xxvi, 762—in mixtures (spir. æth. nitr.), *Vogeler*. xxx, 99—*powder*. xxi, 223—*collect.* and *prep.* in England, *Fairgrieve*. xxii, 118.
 — fr. **LACTUA CANADENSIS**. xxviii, 145.
 — **FRENCH** (fr. *sativa*), constituents, *Buttin*. xxi, 223—*prep.*, *Aubergier*. xxv, 153.
 — **GERMAN** (fr. *virosa*), constituents, *Buttin*. xxi, 223.
Ladanostirion, Greece. xxiv, 182; xxvii, 224, 5.
Ladenbergia BERGENIANA;—**L. CUJABENSIS**;—**L. FIRMULA**;—**L. MACROCNEMIA**, Brazil. xxx, 200.
Ladies' slipper, see **CYPRIPEDIUM**.
Lärche—*Larix europæa*. xxvi, 321.
Lævulan in molasses of beet root, *Lippmann*. xxx, 368.
Lævulin fr. *Helianthus tuberosus*, *Dieck and Tollens*. xxviii, 146, 7.
Lævulose, fr. *inulin*, crystall. *Jungfleisch and Lefranc*. xxx, 378—*compound with lime*, *Peligot*. xxix, 310.

- Lagenaria VULGARIS**, var. **AMARA**;—**L. VULG.** var. **CLAVATA**, India, descript., Dymock. xxvii, 229, 230.
- Lah**=shellac, India. xxvii, 195.
- Lal chitra**=*Plumbago rosea*, India. xxv, 134.
- Lala**=*Papaver rhoeas*, India. xxvi, 162.
- Lalaphat-kari**=*Cardiospermum haliocacalum*, India. xxvi, 166.
- Lamb's quarters**=*Chenopodium album*, Kansas. xxix, 441.
- Laminaria BULBOSA**, yield of kelp and iodine. xxvii, 133, 4.
- **CLOUSTONI**, therapeut. value, Wheeler. xxx, 139.
- **DIGITATA STENOLOBA** and **DIGIT. STENO-PHYLLA**, yield of kelp and iodine. xxvii, 133, 4.
- **PLEXICAULIS**, infusion. xxx, 70—therapeutic value, Wheeler. xxx, 139.
- **SACCHARINA**, decoct. xxx, 70—emulsifies better than Irish moss, Wheeler. xxx, 139—yield of kelp and iodine. xxvii, 133, 4—therapeut. value, Wheeler. xxx, 139.
- spec., Turkestan. xxi, 203.
- Lamp, ALCOHOL**, applicat. of petrol. burners, Mohr; Munder. xxx, 49.
- **BLAST**-, with centrifugal fan, Morrel. xxix, 44—rotary pinion, Schober. xxix, 43.
- **CARBO-OXYGEN**, Philip. xix, 136.
- **PHOSPHORUS**. xxv, 56.
- Lampazo**, Arg. Republ. xxiv, 764.
- Land, R. H.**, discussions. xxvi, 896, 900, 908, 912.
- Lane, A. S.** xxviii, 537.
- Lanthanum**. xxiii, 284; xxv, 256.
- salts (**OXIDE**, **OXYCHLORIDE**, **SULPHATE**, **PHOSPHATE**), Frerichs. xxiii, 285—fluorescence, Soret. xxvii, 346.
- Lanthopina**, Hesse. xviii, 262—history. xxi, 375.
- Laportea CANADENSIS**, Kansas. xxix, 452.
- Lappa, MAJOR**, Kansas. xxix, 442—see also **ARC-TIUM LAPPA**; **BURDOCK**, etc.
- Laranjeiro DO MATO**=*Esenbeckia febrifuga*, Brazil. xxiii, 190.
- Larch, COMMON; EUROPEAN**=*Larix europæa*. xxvi, 321.
- Lard, adult** (water, starch, terra alba, lime). xix, 335; xxi, 142—should be rendered by the pharmacist, Markoe. xxi, 512—sp. gr., Hager. xxvii, 424.
- **ARTIFICIAL** (lard oil and paraffin), Babcock. xxiii, 796.
- **BENZOATED**, Lewis. xxviii, 43.
- Laricis DE CORSE**=*Pinus laricin*, D. C. xxvi, 317.
- Larix** (Pliny);—**DECIDUA**, Wall.;—fol. **DECIDUIS**, J. Bauh.;—**EXCELSA**, Linck;—**PYRAMIDALIS**, Salisbury;—**VULGARIS**, Spach,=*Larix europæa*, D. C. xxvi, 321.
- **DECIDUA**, oil, prop. xxvi, 438.
- **EUROPÆA**, D. C. xxvi, 321.
- Larkspur seed** substit. by **Stavesacre seed**. xxiii, 502.
- Larrea MEXICANA**, Arizona. xxvii, 206; California. xxvii, 608—account of shellac, Stillman. xxix, 211.
- Lasora**=fruit of *Cordia myxa* and *C. latifolia*, India. xxviii, 129.
- Laudania**, physiolog. action, Ott. xxvi, 277—prop. Hesse. xviii, 262—history. xxi, 375.
- Laudanosina**, history. xxi, 375—physiolog. act., Ott. xxvi, 277.
- Laughing gas**. See **NITROGEN, PROTOXIDE**.
- Lauraceæ**. xxi, 210; xxiii, 141, 162; xxiv, 129; xxv, 131; xxvii, 147; xxviii, 117; xxx, 154; of California, xix, 305; Kansas. xxix, 446.
- Laurel BERRIES**, yield of volat. and fixed oil, Osse. xxiv, 276.
- **LEAVES**, febrifuge and antiperiodic, Doran. xxi, 210.
- in Australia. xxviii, 100.
- Laurel, BASTARD**,=*Viburnum tinus*, France. xxvi, 242.
- **BAY**-, CALIFORNIA = *Oreodaphne californica*. xxiii, 145; xxvii, 601; which see.
- **HAWTHORN**, *Heteromeles arbutifolia*, California. xxx, 138.
- **ROSA**, Arg. Republ. xxiv, 763.
- Laurelia AROMATICA**;—**SERRATA**, Chili. xxiv, 765.
- Laurestine**=*Viburnum tinus*, France. xxvi, 242.
- Laurier THYM**=*Viburnum tinus*, France. xxvi, 242.
- Laurocerasin**, Lehmann. xxiii, 439.
- Laurocerasus**. See **CHERRY LAUREL**.
- Laurus CAMPHORATUS**, Japan. xxiv, 129.
- **CAUSTICA**, Chili; Arg. Republ. xxx, 155.
- **CALIFORNICA**. xxviii, 264; see also **OREODAPHNE CALIFORNICA**.
- **NOBILIS**, therapeut. value, Doran. xxi, 210—in Greece. xxiv, 129.
- Lavatera ARBOREA**, Chili. xxiv, 766.
- **ASSURGENTIFLORA**, California. xix, 300.
- **HISPIDA**, Morocco. xxiii, 191.
- **OBIA**, India. xxix, 148.
- Lavender**, act. of sulph. ac. and alcohol, Doliber. xix, 444.
- **CULTIVATION**: Australia. xxviii, 100—Bedding-ton (England). xxi, 219—England. xxiv, 819—France. xxiv, 823—Hitchin. xxvi, 208—Mitcham. xxiii, 151—Ootacamund. xxix, 115.
- **WATER** (English; French), Avery. xxvii, 124.
- Laver**=*Forphyra vulgaris*. xxvii, 134.
- Lavoësiu**m, Prat. xxv, 31—fr. iron pyrites. xxv, 267.
- Lawsonia ALBA**, India, descript., Dymock. xxvii, 238—microscop. examin., Paschkis. xxix, 207.
- **INERMIS**;—**SPINOSA**, Egypt. xxiii, 209; xxix, 207.
- Lead**. xviii, 219; xix, 211; xxi, 304; xxii, 199. xxv, 262; xxvi, 403; xxvii, 356; xxx, 299.
- in California. xxvii, 592, 627, 653—act. on nitr. ac., Acworth and Armstrong. xxvi, 343; of ozone, Mailfert. xxx, 259; of trimethylamine on salts, Vincent. xxv, 315; of water (only when in contact with copper), Casamajor. xix, 211; dist. water acts very rapidly; traces of lime prevent act., Dumas; Leblanc, xxii, 199—detect. in tinned vessels, Fordos. xxiii, 34; Roux. xxx, 299—estimat. (as iodate), Cameron. xxvii, 356; in presence of zinc, Storer. xviii, 239—poisoning (milk prevents), Didierjean. xix, 212; fr. plated pitchers, Hayes. xix, 212.
- Lead ACETATE**, act. upon resins, gum-resins, balsams, Hirschsohn. xxvi, 454—adult. (sulph. zinc, nitrate lead). xix, 344—estimat. of acet. ac., Seward. xxiii, 370; Fresenius. xxiii, 369—fluid volume, Candidus. xxvii, 709—manuf., precautions, Pfund. xxiv, 321—pill excipient (manna). xxx, 101—solubility in alc., Candidus. xxx, 565.
- **ACETATE, BASIC**, cryst. prep. xix, 212.
- **AMIDOSULPHONATE**, Berglund. xxvii, 331.
- **ARSENIDE**, Deschamps. xxvii, 367.
- **CARBONATE**, see **LEAD, WHITE**.
- **CHAMBER CRYSTALS** (—nitrosyl sulphate) as disinfect., Girard and others. xxix, 244.
- **CHLORIDE**, as disinfect. xxv, 262.
- **CHROMATE**, estimat. of sulph. lead, Lowe. xxii, 200.
- **GAMBOGIATE**, Costelo. xxvii, 210.
- **GLYCERIDES**, Morawski. xxx, 359.
- **HYPOPHOSPHATE** (acid sod. hypophosphate and acet. lead), Sulzer. xxvi, 361.
- **IODIDE**, cost of home-made. xx, 206—solution, Tommasi. xxi, 183, 304.
- **NITRATE**, fluid volume, Candidus. xxvii, 709.
- **OLEATE**, Gerrard. xxi, 348.
- **OLEO-PALMITATE**, Wolff. xxx, 36c.
- **OXIDE**, temp. of reduct. by hydrogen, Müller. xix, 138—best test for peroxide hydrogen. xix, 179. See also **LITHARGE**.
- **PEROXIDE**, estimat. of value, Fleck. xxx, 300—constit., Debray. xxvi, 403.
- **SUBACETATE, SOLUTION**, see **LIQUOR PLUMBI SUBACETATIS**.
- **SULPHATE**, decomp. by chloride sodium, Matthey. xxvii, 357—soluble in basic acet. lead, Stammer. xxx, 300; in several acetates, Debits. xxii, 200—into chloride by sol. in mur. ac., Scheffer. xxiv, 217—solub. in sulph. ac., Struve. xviii, 224.
- **SULPHOCHROMITE**, Græger. xxx, 297.
- **TANNATE**, preserved. xxx, 398.
- **TUNGSTOBORATE**, Klein. xxx, 300.
- **WHITE** (in oil), estimat., Biart. xxi, 127—Pittsburg drug market. xxi, 443.
- Lead plant**=*Amorpha canescens*, Kansas. xxix, 446.

- Leafcup**=*Polymnia canadensis*, Kansas. xxix, 442.
- Leather**, tanned with glycerin. xxi, 344—dressing. xxx, 135—in California. xxvii, 654—cemented to guttapercha. xix, 173; to iron or steel. xix, 175—black varnish, Valt. xxx, 135.
- **flower**=*Clematis viorna*, Kansas. xxix, 449.
- Leaves**, when to gather, Diehl. xviii, 140; Brandis. xxviii, 100—ashes ought to be studied, rare and new chemicals might be discovered, Wanklyn. xxii, 162—reddening in autumn; causes, Schwabe. xix, 309.
- **SERRATED**, the angles in direct relation to the chemical constituents, Strohecker. xix, 310.
- Leche de POPA**=Balata, Honduras. xxx, 186.
- Lechea MAJOR**, Kansas. xxix, 441.
- Lecheron CAUSTICO**, Arg. Republ. xxiv, 764.
- Lechon RUSIN**, fr. a spec. of *Hippomanea*, Mexican. xxiv, 768.
- Ledum CAMPHOR**, color reactions, Kossow. xxvi, 434.
- **GLANDULOSUM**, California. xix, 303.
- **LATIFOLIUM**, descript., Maisch. xxvi, 221.
- **PALUSTRE**, descript., Maisch. xxvi, 221—detect. in beer, Dragendorff. xxx, 339—analysis, Iwanow. xxv, 154—as insecticide. xxiv, 140—prop. of oil, Tropp. xxiv, 282.
- Leeches**, PRESERVATION, (iron filings), Reymann. xxx, 253—(muck), Holmes. xxiii, 230—(peat), Schwonder. xxix, 239; Vogeler. xxx, 253—(pebbles), Rothenhäusler. xxii, 169; xxiii, 230—water plants, Enders. xxi, 265; Ludwig. xxi, 266.
- **AMERICAN** are valueless (6 Swedish—100 American). xxv, 237.
- **COLLECTION** in Anjou (France), Menière. xxiii, 231—in Greece, Belle. xxvi, 329—in Pennsylvania. xxiv, 205.
- Lees** (wine) analysis of various, Warrington. xxiv, 334—amount of tartar ac., Warrington. xxiii, 197, 383.
- Legislation**. xxiv, 661. See also COMMITTEE and REPORT.
- Legumin**, decomp. product by boil. with sulph. ac., Ritthausen. xix, 236.
- Leguminosæ**. xviii, 283; xix, 272; xxi, 254; xxii, 149; xxiii, 210; xxiv, 189; xxv, 207; xxvi, 284; xxvii, 241; xxviii, 182; xxix, 209; xxx, 238; of California. xix, 300; Kansas. xxix, 446; Mexico. xxiv, 776.
- Lehlbach, P. Fr.** Sapo viridis. xxi, 604.
- Lehn, Louis**, report on drug market. xxviii, 367; xxix, 370; xxx, 461.
- Leis, George**, cologne for sick-room. xxiv, 493, 6—magnesia. xxv, 451.
- **discussions**: xx, 102, 103; xxi, 70; xxiv, 687, 688, 689, 690; xxix, 493.
- Lemberger, J. L.**, cosmoline. xxii, 384, 507, 509, 511—extr. opium. xxvi, 898—fluid extr. lactucarium. xxvi, 762, 897—milk-sugar. xx, 245; xxix, 436—paraffin oil preparations. xxiii, 627—pulvis aromaticus. xxi, 588—thymol and oil of thyme. xxx, 571, 681—urethral suppositories. xix, 482—wild cherry bark, cause of var. in color of infus. xviii, 66; xix, 503.
- **discussions**: xviii, 66; xxii, 507, 508, 509, 510, 511, 524; xxiii, 754; xxvi, 897, 898, 906; xxvii, 773; xxix, 509, 510; xxx, 618, 661.
- Lemna MINOR**, Kansas. xxix, 447.
- Lemnaceæ**, Kansas. xxix, 447.
- Lemon**. See also LIME.
- **yield of citric acid**, Wehrli. xxvi, 547—in California. xxvii, 633—in Greece. xxix, 195.
- Lemonade**, GLYCERIN, Schulze. xxi, 171.
- Lemoncillo**=*Dalea citriodora*, Mexico. xxiv, 776.
- Lemon juice**, adult. (nitric ac.), Scribani. xxvii, 109—difficulty of neutralizing with chalk is due to phosph. ac. and iron, Warrington. xxiv, 331—preservation (10 p. c. alc.), Judicis. xxix, 195—raw, prop., acidity, Warrington. xxiv, 329—purified. xxviii, 71—fr. GREEK. xxiv, 170—concentrated ITALIAN, acidity, Warrington. xxiv, 329.
- Lengua de ciervo**=*Polypodium lanceolatum*, Mexico. xxiv, 769.
- Lentibulariaceæ**. xxx, 162.
- Lentils** contain leucin, Gorup-Besanez. xxii, 151.
- Leonotis NEPELÆFOLIA** India, descript., Dymock. xxviii, 127.
- Leonurus CARDIACA**, Kansas. xxix, 446—L. SINENSIS, China. xxiv, 7:6.
- Leotia LUBRICA** cont. oxalic ac., Hamlet and Plowright. xxvi, 178.
- Lepidium BONARIENSE**, Brazil. xxvii, 152—L. CALIFORNICUM; L. MENZIESII, California. xix, 299.
- **SATIVUM**, oil, prop. xxiii, 336; in Brazil. xxvii, 152—L. VIRGINICUM, Kansas. xxix, 443.
- Lepidolite** as source of cæsium, Sharples. xxiii, 273.
- Lepiota PROCERA**, cont. oxal. ac., Hamlet and Plowright. xxvi, 178.
- Leptandra**, Kansas. xxix, 451—adult. of powd. xxx, 576—yield of resins increases with age, Lloyd. xxviii, 422—not attacked by *Tinea zcæ*, Saunders. xxi, 627.
- Leptandrin** (eclectic.), history, Lloyd. xxviii, 421, 2—solubility, Parker. xxx, 128—examined, Little. xxiv, 412; xxv, 98.
- Leptomeria ACIDA**, Australia, oxal. ac., in fruit, Rennie. xxx, 154.
- Lerchenbaum**, GEMEINER;—L. WEISSER = *Larix europæa*, D. C. xxvi, 321.
- Letters (FROM)**, Am. Med. Association about committee on maximum doses. xxiv, 605—W. C. Baker, about drug store to be exhibited at the Centennial. xxii, 567—Billings, Clapp & Co., about cinchoquinine. xxii, 645—J. R. Blaney, about cinchoquinine. xxii, 646—British Pharm. Conference, introducing H. B. Brady. xix, 26—J. T. Buck, about react. between tinct. gelsemin. and nitric ac. xxi, 94—Conference Schools of Pharmacy about Tennessee Coll. Ph'y. xxiii, 829—Danish Apoth. Association, thanks for invitat. xxiv, 592—G. S. Dickey, about his paper. xix, 41—A. E. Ebert, about his donation. xxi, 58—J. Fehr (complaints). xxiv, 620—S. S. Garrigues, about pharmacy in Michigan. xxv, 394—H. A. Gent, about cinchoquinine. xxii, 645—North German Ap. Soc., thanks for congrat. xix, 77—German Ap. Soc., thanks for invitat. xxiv, 593—Chas. W. Grassley, resignation. xxi, 68—F. R. Guiteau, about opium swindle. xxii, 554, 5—B. Lyman, Ontario, regret at not meeting. xxv, 473—G. A. Mariner, about cinchoquinine. xxii, 646—R. V. Mattison, about opium swindle. xxii, 555—J. R. Mercein, about his report on progress. xxi, 44—A. W. Miller, about Centennial fund. xxv, 481—Phil. Coll. Ph'y, about making the college headquarters in 1876. xxiii, 844—S. P. Sharples, about cinchoquinine. xxii, 646—J. T. Shinn, about inability to attend. xxix, 478—Swiss Ap. Association, thanks for invitat. xxiv, 593—Tennessee College of Pharmacy, about irregular diploma. xxiv, 610, 611—W. S. Thompson, about error regarding Squibb's retort stand. xxii, 565—Medical Soc. Virginia, about exchange. xxi, 79.
- Letters (TO)**, Am. Medical Association, about maximum doses. xxiv, 604—Presidents of var. pharmaceutical societies Europe (invitation). xxiv, 589—International Pharm. Congress at St. Petersburg (invitation). xxii, 471; xxiii, 771.
- Lettuce**. See LACTUCA.
- **BLUE**,= *Mulgedium acuminatum*, Kansas. xxix, 442.
- Leucin** found in lentils, Gorup-Besanez. xxii, 151—in potatoes, Schulze and Barbieri. xxviii, 120.
- Leucogallol**, fr. pyrogallol, Stenhouse and Groves. xxiv, 342.
- Leucoline** and quinoline are not identical, Williams. xxx, 418.
- Leucotin** in Paracoto bark, Jobst and Hesse. xxviii, 202.
- Leukanilin** re-converted into rosanilin by charcoal, Hoffmann. xxiii, 432.
- Levisticum APIIFOLIUM**, California. xix, 302.
- Levulose**. See LÆVULOSE.
- Lewah**, India—paste of opium and water. xxiv, 729.
- L'fuely**=*Astragalus eriophaca* and *Phaca vatica*, Morocco. xxiv, 115.
- Liatris CYLINDRACEA**, Kansas. xxix, 442.
- **ODORATISSIMA**, account, Jackson. xxii, 116; Miller. xxiii, 164—constituents, Wood. xxx, 194—microscop., Paschkis. xxix, 159.

- Liatris SCARIOSA**, Kansas. xxix, 442.
 — **SPICATA**, substit. by *Aletris farinosa*. xxiii, 501
 — by *Liatris squamosa*. xxiii, 501—in Kansas.
 xxix, 442.
 — **SQUARROSA**, Kansas. xxix, 442.
Libanotis, China xxiv, 753.
Liberia, drugs, Holmes. xxvi, 168.
Libertia spec., Chili xxiv, 766.
Libidibi, India. xxiv, 191.
Libocedrus DECURRENS, California. xxvii, 600.
Licari kanali, Cayenne=*linaloes*. xxx, 324.
Lichen ESCULENTUS, analysis, Lacour. xxx, 145.
Lichen islandicus SACCHARATUS, Dutch Phar.
 Soc. xxx, 68—see also **CETRARIA**.
Lichenin, prep. and prop., Berg. xxi, 204.
Lichenes. xix, 263; xxi, 204; xxii, 96; xxiii, 124;
 xxx, 145.
 — yield alcohol, Stahlschmidt. xix, 241—alcohol
 distillery in Finland. xxi, 327.
Licorice extract ("BLACK,") adult. (charcoal).
 xviii, 282; xix, 348; of powd. xxx, 576, 580—
 comparat. examinat. of commercial brands,
 Madsen. xxx, 76; Martindell. xxi, 255—esti-
 mat. of arabin and of sugar, Madsen. xxx, 77—
 purified, Shorting, Ungewitter. xxiii, 58.
 — **AMERICAN**, Miller. xxii, 394; xxiii, 59—discus-
 sion. xxii, 498.
 — **ASIA MINOR**, xxii, 151; xxv, 210.
 — root, adult. of powd. xxi, 486; xxx, 576; de-
 tect. of mineral adult. by chloroform. xxviii,
 278—alcohol. fermentation, Griessmayer. xxiii,
 339—analysis, Sestini. xxvii, 246.
 — **CULT.** in Anatolia. xxii, 150—in Mitcham. xxiii,
 212—in Spain. xxx, 243.
 — **WILD**=*Galium circæzans*, Kansas. xxix, 450.
Liebig memorial. xxii, 530—committee. xxiii, 846
 —discussion. xxii, 531—4—report. xxiii, 795;
 xxiv, 605.
Lien-gau=*Nelumbium speciosum*, China. xxviii,
 115.
Life-everlasting = *Gnaphalium macrocephalum*,
 California. xxvii, 611.
Life membership. xx, 39, 60; xxv, 526, 7, 541;
 xxvi, 889, 911, 2, 3; xxvii, 800, 1.
Light, INTENSE (olivine, calc. magnesia), Stein.
 xxiii, 113—(bisulph. carb., nitr. oxide), Delach-
 anal. xxiii, 113—(magnesium dust, chlorate pot.).
 xxvi, 152.
Lightning-beetle=*Pyrophorus noctilucus*, So.
 America, uses. xxvii, 818, note.
Lignin, test (phloroglucin), Wiesner. xxvii, 436.
Ligusticum ACUTILOBUM, Japan, description,
 Holmes. xxviii, 160—*APIFOLIUM*, Utah. xxvii,
 193.
Ligustrum IBOTU, Japan, analysis of seeds, Mar-
 tin. xxvii, 162.
Ligustrum LUCIDUM, China. xxix, 305.
Liliaceæ. xix, 296; xxi, 208; xxii, 100; xxiii, 133;
 xxiv, 123; xxv, 126; xxvi, 190; xxvii, 140;
 xxviii, 108; xxix, 128; xxx, 149; of California.
 xix, 307; Kansas. xxix, 447.
Lilium WASHINGTONIANUM, California. xix, 307.
Lillard, Benj. Homœopathic pharmacy. xxi, 609
 —about irregular diploma. xxiii, 832—Tennes-
 see opium. xx, 241.
 — discussions. xx, 87; xxii, 499; xxiii, 821, 830,
 831, 833, 834, 835, 836, 837, 838, 839, 840, 842;
 xxiv, 610, 613, 615.
Lily of the Valley, cult. in France. xxvii, 283.
Lily white, superior of Kidder & Co., and Royal
 Spanish of Hawkes & Co., analysis, Risser.
 xxiv, 420.
Limes. See also **LEMONS**.
 — yield of citric ac., Wehrli. xxvi, 547.
 — **JUICE**, raw, acidity, Warrington. xxiv, 329—
 can not be neutralized with chalk, Warrington.
 xxiii, 384—concentrated, acidity, Warrington.
 xxiv, 329.
Lime. See also **CALCIUM**.
 — in crystals (heat nitrate), Brügelman. xxvii,
 332—solubility in water, Pavesi. xxiii, 277;
 Lamy. xxvi, 384; increased by glycerin, Carles.
 xxv, 80; in solut. chloride calc., Post. xxviii,
 238.
 — **CARBOLATE**, adult. (oil tar for carbol. ac.). xxiv,
 408—commercial, analyzed, Loughlin. xxiv, 408.
 — **CAUSTIC**, free fr. carbonate (dip in oil and re-
 Lime. (*Continued.*)
 calcine). xix, 203—as substit. for dynamite.
 xxvii, 233.
 — **CHLORINATED**, act. of mur. ammon. (explosive
 gases), Salzer. xxvii, 305—act. upon resins, gum
 resins, balsams, Hirschsohn. xxvi, 455—consti-
 tution, Göpner. xxii, 177; (contradicted by
 Schorlemmer. xxii, 177)—rationale of formation,
 Hurter. xxvii, 304; Kopfer. xxiv, 217; Lunge
 and Schäppi. xxix, 247—rate of loss of chlorine.
 Patterson. xxiii, 244—best disinfect. for privies,
 Eckstein. xxi, 276; xix, 166—estimat., Davis.
 xxi, 275—drug market. xx, 116; xxi, 428, 449—
 hygroscopicity, Whewell. xxvii, 305—manu-
 fact., Opl. xxiv, 217 (see also **CHLORINE**, man-
 ufacture, and **CALCIUM, HYPOCHLORITE**)—statist-
 ics. xviii, 232.
 — **QUICK-**, see **LIME, CAUSTIC**.
 — **SACCHARATED**, antidote to carbolic ac., Huse-
 mann. xxi, 340; xxii, 238—dissolves old gelatin.
 xxi, 354—prep., Husemann. xxi, 354; Benedict.
 xxii, 247.
 — **UNSLAKED**. See **LIME, CAUSTIC**.
Limestone, California. xxvii, 593.
Limonin in *Aurantaceæ*. xxvii, 528—identical
 with colombin, Schmidt; (denied by Paterrio
 and Ogialoro). xxviii, 347.
Linaceæ. xxiii, 191; xxix, 194; of California. xix,
 300.
Linaloe=*Amyris linaloe*, Mexico. xxiv, 777—oil,
 prop., Morin. xxx, 324.
Linaria VULGARIS, Kansas. xxix, 451.
Lincoln, H. W. xxiv, 660.
Lindera BENZOIN, Kansas. xxix, 446. See also
BENZOIN ODORIFERUM.
Linden. See also **TILIA**.
 — **FLOWERS**, loss in drying. xxi, 202—substit. by
 flowers of *Tilia parviflora*. xxiii, 502.
Linen, detect. of cotton. xxvi, 505.
Lingoor=*Vitex negundo*, India. xxv, 141.
Lingue-TANNIN, fr. *Persea lingue*, Chili, Arata.
 xxx, 155.
Liniment. See also **LOTION**.
 — **PROPRIETARY**, analyzed. Pierron. xxiv, 420.
 — **PH. BRIT.** (oleic acid suggested), Tichborne.
 xxiii, 71.
 — **ACONITE**, Blackwell. xxvii, 71.
 — **ALKALINE RHEUMATISM**, Futrell. xxv, 83.
 — **AMMONIA**, Rother (alc.). xxi, 132—Tichborne
 (oleic acid). xxiii, 71—Wilder (oleic acid). xxvi,
 111—revis. U. S. Ph. xxvii, 676.
 — **AMMON. IODID.**, Bedford. xxi, 174—(Giles),
 Davis. xxv, 83.
 — **BELLADONNA**, Ph. Brit., criticised, Umney.
 xxiii, 71.
 — **CALCIS** (glycerite lime), Laub. xxv, 80—(sucrate
 lime), Latour. xxii, 76—revision U. S. Ph. xxvii,
 676.
 — **CALC. SACCHARATA**, Ph. Soc. Paris. xxv, 83.
 — **CAMPHORA**, in irritat. fr. cowhage, Weichsel-
 baum. xix, 148—Schmidt. xxii, 76—revis. U. S.
 Ph. xxvii, 677.
 — **CHLOROFORM** (Baltimore). xxii, 338.
 — **CHLOROFORM** and **ACONITE**, Hancock. xxii, 338.
 — **CHLOROFORM COMP.** (Baltimore). xxii, 338—
 (Philadelphia Hospital). xxiv, 79.
 — **OPIUM**, Ph. Brit., strength, Shuttleworth. xxiv,
 181.
 — **POTASSIUM IODIDE** with SOAP, Ph. Brit., Tich-
 borne (oleic acid). xxiii, 71.
 — **SAPONIS**. See also **SPIRITUS SAPONIS**.
 — **SAPONIS**, George (oleic acid, bicarb. sod.). xxx,
 85—Goodman (dry soap and a little heat). xxiii,
 72—Græffe (grated soap). xxi, 132—Hallberg,
 (more water). xxv, 83—Heilmann (castor oil
 soap). xxiii, 358; Sayre. xxi, 173—Tichborne,
 (oleic ac.). xxiii, 71—Wharton (expedit. mani-
 pul.). xxi, 132—Wood (almond oil soap). xviii,
 254.
 — **SAPONIS VIRIDIS**, Philadelphia Hospital. xxiv,
 79—Hebra. xxi, 181.
 — for **SCABIES** (arsenite pot.), Clemens. xxiii, 73.
 — **ST. JOHN LONG**, Collier (quillaya). xxvii, 84—
 Moore. xxix, 73.
 — **STOKES**, Hancock. xxii, 339—Moore. xxix, 74.
 — **TEREBINTHINA**, Ph. Brit., Tichborne (oleic
 ac.). xxiii, 71.

- Liniment, TEREBINTH. ACET.**, Collier (quillaya). xxvii, 84—Princep (olive oil for water). xxvii, 84—Symons (glac. acet. ac.). xxiv, 79; xxvii, 83.
- TEREBINTHINA COMP.**, Philadelphia Hospital. xxiv, 79.
- Linosyris MEXICANA**, Rothrock. xxiv, 187.
- Linseed.** See **FLAXSEED**.
- Lint, BORATED**, Solger. xxvii, 120.
- BORO-CARBOLATED**, Solger. xxvii, 121.
- IODOFORMATED**, Keyworth. xxvii, 92.
- fr. PAPER**, Keen. xxvi, 157.
- Linum AQUILINUM**, Chili. xxiv, 766;—**CALIFORNICUM**. xxvii, 608;—**CONGESTUM**;—**SPERGULINUM**, California. xix, 300.
- Lip salve**, Bienert. xxix, 64.
- Lippia CALLICARPÆFOLIA**;—**CITRIODORA**;—**GRAVEOLENS**, Mexico. xxiv, 772;—**LICOIDES**, Chili. xxiv, 766.
- Liqueurs**, freed fr. fusel oil. xxvii, 126.
- de Coire**. xxiv, 105.
- Liquids**, **BOILING POINT** of two non-miscible lower than the most volatile, Kundt. xix, 138.
- CONCENTR.** (by a continuous band of cloth) Squibb—by freezing, Herrera; Goodale. xxx, 79.
- INFLAMMABLE**, spec. gr. bottle, Tribe. xxii, 38.
- INCREASE** of **VOLUME** by dissolving solids, Candidus. xxvii, 709, 786.
- SPEC. GR. apparatus**, Sprengel. xxii, 36.
- Liquidamber ALTINGIANA**, descript. of resin, Möller. xxiii, 159.
- ORIENTALE**, prop. of balsam. xxii, 113—account and descript. of products, Möller. xxiii, 157—balsam, behav. to reagents, Hirschsohn. xxvi, 453-459.
- STYRACIFLUA**, balsam contains cinnamic ac., Harrison. xxii, 113—descript. of resin, Möller. xxiii, 159.
- Liquor.** See also **SOLUTION**.
- FERMENTED**, contain an alkaloid, Oser. xix, 224.
- ACID. PHOSPHOR.**, Shinn. xxix, 76.
- ACID. PHOSPHOR. COMP.**, Shinn. xxix, 76.
- AMMONII**, etc., see **SOLUTION, AMMONIUM**.
- ANAESTHETICUS Aranii**. xxvi, 474—Wiggers. xxvi, 474.
- ACID. ARSENICI**, Dutch Phar. Soc. xxx, 86.
- ARSENICALIS FOWLERI**. See **SOLUTION, POTASSIUM ARSENITE**.
- ARSENICI ET HYDRARGYRI IODIDI**, revis. U. S. Ph xxvii, 677.
- ARSENICI**, etc., see **SOLUTION, ARSENIC**.
- BISMUTHI**, Méhu. xxii, 84—cont. silver, Ekin. xxi, 309.
- BROMINII**, Philadelphia Hospital. xxiv, 82.
- CHLOROFORM. COMP.** suggested name for chlorodyne. xxiii, 611—prep. Squire. xxiv, 80. See also **CHLORODYNE**.
- EPISPASTICUS**, Ph. Brit. (acet. ether better) Deane. xxiv, 80.
- EUCALYPTI GLOBULI**. xxiv, 805.
- FERRI**, etc. See **SOLUTION, IRON**.
- HYDRARGYRI NITRATIS** drop equivalent, Talbot. xxix, 34.
- KINO FORTIOR**, Ellinor. xxii, 85.
- MAGNESII CITRATIS**, adult. (tartar. sodium). xix, 347; xxi, 495; xxii, 314—discussion. xix, 103, 4—examin. of commercial, Markoe. xix, 532; Schrage. xxiii, 515—prep., Fairthorne. xxx, 87; Hogan. xxiv, 81; Polk. xxi, 182; Rhinehart (sulph. magn.) xxv, 85; Sargent (citr. sod.) xix, 530; Schlotterbeck. xxiv, 81; Watts. xxv, 85; Wehrli. xxiii, 74; Wesley. xxv, 85.
- MAGNESII et SODII TARTRATIS**, Rother. xix, 205.
- OPII SEDATIVUS BATTLEI**, Diehl; Shuttleworth. xxix, 74 and note—Wells. xxiii, 73.
- PICIS ALKALINUS**, Buckley. xxii, 85.
- PLUMBI SUBACETATIS** (in 24 hours), Hennig. xviii, 213—(without heat), Nerwing. xix, 212—(hydrate of lead), Rother. xxi, 133.
- PLUMBI SUBACETATIS C. OPIO**, Philadelphia Hospital. xxiv, 82.
- RHAMNI FRANGULÆ**, Baildon. xxiii, 73.
- SENNÆ**, Wells. xxiii, 74.
- Liquor, SODÆ CARBOLATIS**, Dutch Phar. Soc. xxx, 91.
- STIBII CHLORATI**, Ph. Germ., Reichardt. xxx, 86. See also **BUTTER, ANTIMONY**.
- Liquor license** for apothecaries, discussions: xix, 64, 65, 86, 87; xx, 29; xxii, 497, 545; xxix, 481, 517—for Iowa. xxix, 482; Kansas. xxix, 482; Maine. xxv, 387; Missouri. xxvii, 661, 6; South Carolina. xxii, 332.
- Liquorice**, see **LICORICE**.
- Lirishk**=fruit of a spec. of *Berberis*, India. descript., Dymock. xxv, 164.
- Lists**, see respective **SUBJECTS**.
- Lister's salve**, see **UNGUENT. ACID BORACICI**. xix, 63.
- Liter, STANDARD**, Markoe. xxv, 567.
- Litharge** cont. metallic lead, Rump. xviii, 239. See also **LEAD, OXIDE**.
- Lithia**, occurrence, Dieulafoy. xxviii, 237.
- Lithium**. xxiv, 240; xxvii, 332; xxviii, 237.
- in rocks and sea-water, Dieulafoy. xxvii, 332.
- AMIDOSULPHONATE**, Berglund. xxvii, 331.
- BENZOATE**, Shuttleworth. xxiii, 374.
- BI-ACETATE**, Lescœur. xxiv, 322.
- BISULPHATE**, Lescœur. xxiv, 241.
- BORO-CITRATE (MONO-, DI-, TRI-)**, Scheibe. xxix, 320.
- BROMIDE**, Yvon. xxiv, 240.
- CARBONATE**, fr. lepidolith, Filsinger and Hoffmann. xxiv, 240—contaminat. (with sugar milk, chlor. pot., sulph. pot.), Schlagdenhauffen. xxi, 494.
- CITRATE**, Umney. xxiv, 331.
- IODIDE**, Zeisst. xxx, 102.
- SALICYLATE**, Hoffmann. xxvi, 541—physiolog. effects, James. xxix, 314.
- Lithospermum ARVENSE**, Kansas. xxix, 440.
- ERYTHROHIZON**, Japan, analysis of root, Kuhara. xxvii, 164.
- Lithy tree**=*Viburnum Lantana*, Europe. xxvi, 243.
- Litmus**, removal of carbonates, Mohr. xxii, 97—pure, prep. xxiv, 383—permanent solut. (glycerin). xxx, 447—substit. by salicylic ac., Weiske. xxiv, 323.
- INDICATOR**, Kretschmar. xxviii, 351.
- PAPER**, see **PAPER, LITMUS**.
- Little, Jas.** xxviii, 570.
- Liver**, human and calf's contain zinc, Bellamy and Lechartier. xxvi, 400.
- Llanten**, Arg. Republ. xxiv, 763, 4.
- Llaullin BLANCO**;—**COLORADO**, Arg. Republ. xxiv, 762.
- Llewellyn, J. F.** discussions: xxix, 508, 517; xxx, 637, 649.
- Lloyd, J. U.** acid hydrocy. dilut. xxiii, 695; xxvi, 705—berberina. xxvi, 800, 892—fluid extracts. xxv, 409—glycerin in fld. extr. xxv, 408—precipitates in fld. extr. xxix, 408; xxx, 509—fld. extr. cottonroot bark. xxiv, 518—fld. extr. licorice root. xxvi, 891—citr. iron and ammonia. xxvii, 741—hydrated oxide iron. xxvii, 740—tartrate iron and potassium. xxvii, 744—citrate iron and quinia. xxvii, 741—resin of leptandra. xxviii, 421—percolation. xxvii, 682; xxix, 408; xxx, 509—resin of podophyllum. xxvi, 767—solubility of chemicals in alcohol. xxx, 621—spir. nitr. æth. xxvii, 723—tinctures fr. fresh and dried herbs. xxvi, 755. 899—tinct. geranium maculat. xxvi, 706—Western plants. xxvi, 707.
- discussions. xxvi, 885, 891, 892, 893, 894, 895, 896, 897, 899, 900, 905, 914, 915; xxvii, 787; xxix, 505, 509, 516, 523; xxx, 617, 619, 621, 622, 624, 625, 626, 628, 649, 652, 654, 658.
- J. U. and C. G.**, senega of commerce. xxix, 453.
- Lobelia (HERB.)**. xxvi, 33—adult. of powd. xxx, 576—prop. time for collecting, Maisch. xxi, 622; xxii, 116—analysis, Lewis. xxvi, 222—Procter's gallic ac. is lobelinic acid, Lewis. xxvi, 223—is not exactly a poison, Plumb. xxvi, 224—80 years ago. xxvi, 849.
- (**SEED**), adult. of powd. xxx, 576—germination, Saunders. xxx, 567.
- INFLATA**, Kansas. xxix, 447.
- NICOTIANÆFOLIA**, India, descript., Dymock. xxv, 155.
- SYPHILITICA**, Kansas. xxix, 447.

- Lobeliaceæ.** xxii, 116; xxvi, 222; of Kansas. xxix, 447.
- Lobeliacrin** (of Enders) is acid lobeliate of lobelina, Lewis. xxvi, 223.
- Lobelianin** (of Pereira). xxvi, 224.
- Lobeliin** (of Reinsch). xxvi, 224.
- Lobelina**, prep. and prop., Lewis. xxvi, 605—is not stable, Richardson. xxi, 383.
- **LOBELIATE**, Lewis. xxvi, 6-7.
- Local organization**, definition, Maisch; Bullock. xxi, 30, 32.
- Loco weed**—*Astragalus spec.*, California. xxvii, 247—*Oxytropis campestris*, California. xxvii, 611.
- Locust**, honey-,—*Gleditschia triacanthos*. xxix, 447.
- Lodhra**—*Symplocos racemosa*, India. xxv, 153.
- Lodicea SEYCHELLARUM**, India, descript., Dymock. xxvi, 162.
- Logwood**, best test for iron and copper, Bellamy. xviii, 283—detect. in wine, Chancel. xxvi, 266—in castor oil is fluorescent, Horner. xxiii, 461—coloring power, Kùpfér. xxiv, 383—process of fermentation (glue water best). xxvi, 291.
- in JAMAICA, account. xxiv, 736.
- Lolium PERENNE**, ergot, Wilson. xxiv, 120.
- **TEMULENTUM**, analysis, Wittstein and several chemists. xxiv, 121—ergot, Wilson. xxiv, 120—in California. xxvii, 605.
- Lomatia FERRUGINEA**, Chili. xxiv, 765.
- Lonicera CALIFORNICA**;—*L. INVOLUCRATA*, California. xix, 302.
- **XYLOSTEUM**, poisonous, Duval. xix, 277.
- Looking glass FACTORY**, injurious infl. of mercury obviated by ammonia, Meyer. xxii, 206.
- Loosestrife**—*Lythrum alatum*, Kansas. xxix, 448.
- Lophanthus**, spec., China. xxiv, 752.
- Loranthaceæ.** xxvi, 245; xxviii, 159; xxix, 448.
- Loranthus**, spec., Chili. xxiv, 766.
- Lo-tha-ho**—*Agar-agar*, China. xxix, 118.
- Lotion.** See also LINIMENT.
- **ANTISEPTICA FRAGRANS**, Leis. xxiv, 496.
- , **CAJUPUT**, Claiborne. xxx, 321.
- **CHLORAL** and **IODINE**, Fairthorne. xxiii, 72.
- **COSMETIC**, GODDARD. xxiv, 84.
- **GLYCERIN**, Moore. xxv, 111.
- **SAPONIS VIRIDIS**, Hebra. xxi, 181—Philadelphia Hospital. xxiv, 79.
- Lotur bark**—*Symplocos racemosa*, India. xxvii, 173, which see.
- Loturia**, prop., Hesse. xxvii, 173.
- Loturidina**, prop., Hesse. xxvii, 173, 4.
- Lotus**, **STONE**-, China. xxiv, 748.
- Louisiana**, pharmacy law. xxx, 477, 491.
- Louisville COLLEGE** of PHARMACY donation of silk-cocoons, herbs, etc. fr. Betanelly, Philadelphia, and Wilson Bros., Boston. xxii, 572.
- Love**, N. C. xxv, 577.
- "Low wine"**—water in crude turpentine. xxix, 235.
- Lowd**, J. C. powdered camphor. xix, 441.
- Loxopterygina**, prop., Hesse. xxx, 185.
- Loxopterygium**, LORENTZII, Brazil. xxviii, 138; xxx, 184—*Quebracho blanco*. account, Arata. xxvii, 283.
- Lozenges.** See also TABLETS.
- **BOARD**, Harrison. xxviii, 87; Marcy. xxx, 124; Slocum. xxviii, 86.
- (**JUJUBE PASTE**), James. xxix, 106.
- **ACID. SALICYL.**, Maury. xxiv, 109.
- **AMMON. MURIAT.**, Hager. xxv, 113.
- **BORAX**, manipulation. xxix, 106.
- **CINCHONIA**, Hughes. xxvii, 117.
- **DIGERENTIA** (=lactophosph. iron, pepsin) Elmer. xxv, 114.
- **IRON BROMIDE**, Prince. xxiii, 107.
- **LAXATIVE**, PALATABLE, Fairthorne. xxx, 126.
- **NITRO-RESINOUS**, Vichot. xxviii, 83.
- **OPIUM**, Ph. Brit., strength, Shuttleworth. xxiv, 181.
- **POTASSIUM CHLORATE**, Wolff. xxviii, 88—Yvon. xxviii, 88.
- **WISTAR'S**, Hill. xxiii, 104.
- Loúma-tschen-tuck**—*Euryangium Sumbul*, China. xxv, 171.
- Luban-mati** (-MEYETI)—*Boswellia Frereana*, is the "elemi" of old writers, Flückiger. xxvi, 296.
- Lucerna ALFAFA**—*Medicago sativa*, Kansas. xxix, 447.
- Lucraban seed**, China. xxiv, 751.
- Lucuma SALICIFOLIA**, Mexico. xxiv, 774.
- Ludwigia ALTERNIFOLIA**, Kansas. xxix, 448.
- Luffa AMARA**, India, descript., Dymock. xxv, 200.
- **ECHINATA**, India, descript., Dymock. xxvii, 228.
- Luhn**, G. J. Annual address. xxvii, 750—inaugural address. xxvi, 872—fld. extr. wild cherry. xxvi, 884.
- discussions: xxiv, 617; xxvi, 872, 884, 885, 895, 902; xxvii, 759, 761, 772.
- Luma**—*Myrtus luma*, Chili. xxiv, 765.
- Luminosity** of decaying wood is due to a fungus. xxii, 95.
- Lupigenin**, Schulze and Barbieri. xxvii, 249.
- Lupinin**, prop., Schulze and Barbieri. xxvii, 249.
- Lupinus LUTEUS**. xxvii, 249.
- **VARIUS**, cont. myosin and vitellin, Vines. xxviii, 366.
- Lupulin adult**. xxx, 576—detect. in beer, Hoffstedt. xxii, 227—exhausted by spir. ammon, arom., Coffin. xxviii, 438—microscop., Harrington. xxv, 229—freed fr. sand by water. Sarrazin. xxiii, 226.
- Lupulina** (of Griessmayer), prop. xxii, 161.
- Lura-kasis**—*Copperas*, India. xxiv, 715.
- Lute** for CORKS. xix, 173.
- for JOINTS, l'hanish. xxviii, 33.
- which withstands OZONE, Jeremin. xxvii, 290.
- Luteina**, yellow principle in both the animal and vegetable kingdom, Thudichum. xix, 235—is probably identical with hæmatoidin of Stædler and Hohn. xix, 236.
- Lychnophylax** (candle guard). xxiv, 714 (10th paragr.)
- Lycina** (of Husemann) identical with betain (Scheibler) and oxynurin (Liebreich). xxiii, 427.
- Lycium ANDERSONI**;—*L. BERLANDIERI*;—*L. PAL-LIDUM*, Arizona. xxvii, 159.
- Lycotonia**, prop., Flückiger. xix, 229 — (of Hübschmann) is probably a decomp. product, Wright and Luff. xxvi, 598.
- Lycoperdon GEMMATUM** cont. oxalic ac., Hamlet and Plowright. xxvi, 178.
- **GIGANTEUM**, China. xxiv, 760—cont. oxalic ac., Hamlet and Plowright. xxvi, 178.
- Lycopodiaceæ.** xix, 264; xxii, 97; xxiii, 125; xxiv, 769; xxv, 120; xxx, 145.
- Lycopodina** fr. *Lycop. complanatum*, Boedeker. xxx, 146.
- Lycopodium**, adult. (dextrin), Lillard. xxi, 481; xxii, 98; (pine pollen), Cazeneuve. xxii, 97, 308; (iosin, starch), Hager. xix, 336; xxiii, 503; (talcum), Scriba. xxiii, 125, 503—yields acetic acid, Schaum. xix, 264—drug market. xix, 404; xx, 125; xxi, 437—microscop., Harrington. xxv, 120—in mixtures, Wilder. xxvi, 125—sp. gr., Hager. xxvii, 424.
- **ALPINUM**;—*L. CLAVATUM*, cont. alumina, Church. xxiii, 126.
- **COMPLANATUM** cont. an alkaloid, Boedeker. xxx, 145.
- **NIDIFORMIS**, Mexico. xxiv, 769—*L. PANICULATUM*, Chili. xxiv, 765.
- **SELAGO** cont. alumina, Church. xxiii, 126.
- Lycopus EUROPEUS**;—*L. VIRGINICUS*, Kansas. xxix, 446.
- Lygodesmia SPINOSA**, California. xxvii, 285.
- Lyperia CROCEA**—*Africa saffron*. xxi, 487.
- Lythraceæ** of California. xix, 301; Kansas. xxix, 448; Mexico. xxiv, 776.
- Lythrum ELATUM**, Kansas. xxix, 448;—*L. CALIFORNICUM*. xix, 301.
- **SALICARIA**, France, in dysentery. xxvi, 281.
- Lytta ASPERSA**, Arg. Republ. xxv, 30, 237.

M.

Mac. See also MC.

Macallina, Donde. xxviii, 200—probably chiefly sulphate calcium, Maisch. xxviii, 200.

Macallo bark, Central America, analysis, Donde. xxviii, 200.

Macaranga TOMENTOSA, India. xxiv, 719.

Macaroni, California. xxvii, 628.

- Mace**, BOMBAY, descript., Tschirch. xxx, 156.
Maceration objected to as wasteful, Stoddart and Tucker. xxi, 194—definition, Lloyd. xxvii, 688.
Machærium FERTILE, Brazil. xxviii, 138.
Machifatri—*Artemisia indica*, India. xxviii, 144.
Machmilli Petachon=*Helteris Isora*, Turkestan. xxi, 235.
Maclaya CORDATA, Japan, analysis, Eyckman. xxx, 233.
Macleyin, Eyckman. xxx, 233—identical with protopin, Eyckman. xxx, 233.
Maclura AURANTIACA, Texas uses, etc. xxi, 261.
 — **TINCTORIA**, Jamaica. xxiv, 736.
Maclurin, related to gentianin (gentisin), Hlasiwetz and Habermann. xxiii, 449.
Macrobasis ALBIDA;—**M. ATRIVITTATA**;—**M. SEGMENTATA**. xxiv, 508.
Macrocarpin fr. *Thalictrum macrocarpum*, Harriot and Doassons. xxx, 212.
Macrocnemum, Vell.—*Remijia Hilairii*, D. C. xxx, 200.
Macrorhynchus GRANDIFLORUS, California. xix, 303.
Maczieva-ya-watu-wawili = Dragon's blood, Zanzibar. xxviii, 108.
Madan murt—root of *Amorphophallus sylvaticus*, India. xxv, 122.
Madder yields golden yellow color, Rochleder. xix, 284.
 — See **RUBIA TINCTORUM**.
Madjoun, mixt. of cannabis and honey, Algeria. xxv, 228.
Madrona tree—*Arbutus Menziesii*. xxvii, 601.
Madzi-ssa—*Shizandra nigra*, Japan. xxviii, 166.
Magendie's solution for hypodermic injection, preserved (carbolic acid), Squibb. xxi, 592—Johnson (sulphurous ac.). xxi, 98, 183—Hancock (sulphurous ac.). xxii, 340.
Magnesia, estimat. difficult in presence of citr. ac., Millot and Maguene. xxiii, 278—p. c. in commercial varieties, Leis. xxv, 451, 530 note—amount of alkali, Leis. xxv, 451—in mixtures, Wilder. xxiii, 77—prep. fr. crude chloride and fr. dolomite, Closson. xxx, 293; Sarrazin (in cast iron crucibles). xxii, 194; fr. sea-water and lime, Schlösing. xxx, 293; on the large scale, (lime and magnes. chlor.) xxx, 292—separat. fr. pot. and soda in analysis, Scherer. xxi, 295—test (iodated alkali), Schlagdenhauffen. xxvii, 335; (is not reliable, Hager. xxvii, 336;) (hypiodide alkali), Schlagdenhauffen. xxviii, 238.
 — **HEAVY**, impurity, Archibald. xxvi, 387—adult. (Rochelle salt), Mattison. xxi, 296, 495—analysis of commercial, Wallace. xxvii, 336—prep., (light magnesia and alc.), Alessandri. xxx, 294.
Magnesian aperient, Billings, Clapp & Co.' analysis, Schrage. xxiii, 88.
Magnesit cont. often nickel, Poleck. xviii, 233.
Magnesium. xviii, 232; xix, 205; xxi, 295; xxii, 194; xxiii, 278; xxiv, 242; xxvi, 387; xxvii, 335; xxviii, 238; xxix, 259; xxx, 292; California. xxvii, 593.
 — act. on nitric ac., Acworth and Armstrong. xxvi, 343—as reducing agent. xix, 205; Boettger. xxiv, 242—salts, act. of trimethylamin, Vincent. xxv, 315—test (alkannin), Lepel. xxix, 354.
 — **AMIDOSULPHONATE**, Berglund. xxvii, 332.
 — **AMMONIO-PHOSPHATE**, spontan. decomp. xix, 206.
 — **BENZOATE**. xxviii, 373—prep., Schlickum. xxvii, 462.
 — **BORATE** of Strassfurth is sedimentary, not volcanic, Dieulafait. xxvi, 361.
 — **BOROCITRATE**. xxviii, 373—therapeut. value, Köhler. xxviii, 316—(mono-, di-, tri-), Scheibe. xxix, 320.
 — **BORO-DISALICYLATE**, Jahns. xxvi, 539.
 — **CARBONATE**, composition, Kraut. xxx, 294—commercial, Bedford. xxii, 567; Otto and Gabler. xxix, 259; Thresh. xxiv, 242; Wallace. xxvii, 336—detect. of lime, Marquardt. xxvi, 387—soluble in alkal. borates, Wittstein. xxiii, 278.
 — **CITRATE**, SOLUTION, see **LIQUOR MAGNESII CITRATIS**.
 — **CITRATE**, GRANULATED, Archibald. xviii, 213—Mattison. xxiii, 487.
Magnesium CITRATE, NEUTRAL, Cornelius. xxviii, 314—SOLUBLE, Mattison. xxiii, 487.
 — **LITHURATE** in calculi of cattle. xxi, 404.
 — **METATARTRATE**, prep., Hager. xxiii, 384—solution changes soon into tartrate. xxiii, 384—Leger. xxi, 495.
 — **RICINOLEATE**, as aperient, Giffard. xxvi, 145—prep., Giffard. xxvii, 101; Hager. xxx, 361.
 — **SELENITE**, prop., Hilger. xxiii, 279.
 — **SILICATE** as substit. for bismuth. nitr. in cholera, Garaud. xviii, 232.
 — and **SODIUM CITRATE**, Rother. xix, 205.
 — **SULPHO (THIO) CARBONATE**, prep., Taylor. xxx, 285.
 — **SULPHATE**, adult. (finely cryst., Glauber's salt). xix, 344—loss in drying, Fairthorne. xxix, 60—fluid volume, Candidus. xxvii, 709—often contains nickel. xviii, 233—solubility in alc., Candidus. xxx, 565—estimat. of sod. sulphate, Hager. xxx, 294—taste masked by coffee. xviii, 232; xix, 206—therapeut. value of dil. solut. with salt, Storer. xxvii, 336.
 — **SULPHITE**, prep., Hager. xxiii, 278—in diphtheritis, Schottin. xxiii, 77.
Magnolia MEXICANA, Mexico. xxiv, 777.
 — **YULAN**, Japan, descript., Holmes. xxviii, 165.
 — petals, yield of glucose and saccharose, Bous-singault. xxvi, 514—buds in China. xxiv, 757.
 — **BALM**, HAGAN'S, analysis, Mitch and Risser. xxiv, 419.
 — **TABLETS**, WRIGHT'S, analysis, Risser. xxiv, 420.
Magnoliaceæ. xxi, 233; xxv, 174; xxviii, 165; xxix, 182; of Mexico. xxiv, 777.
Maguey. xxiii, 435. See also **AGAVE AMERICANA**.
Maharook—*Ailanthus excelsa* and *Cinnamomum tamala*, India. xxv, 181.
Mahla, F. Report on progress of pharmacy. xviii, 202.
Mahoe, fibre fr. *Hibiscus elatus*. xxiii, 193.
Mahogany wood, constituents, Latour and Caze-neuve. xxiv, 175. See also **SWIETENIA MAHOGANY**.
Mahonia PASCICULARIS:—**M. GLUMACHA**, California. xxvii, 203.
 — See also **BERBERIS**.
Mahwa—*Bassia latifolia*, India. xxvi, 219.
Maida-Lakri—*Tetranthera Roxburghi*, India. xxv, 132.
Maiden hair—*Adiantum pedatum*, Kansas. xxix, 445.
Maiden plum—*Comocladia integrifolia*, Jamaica. xxiv, 736.
Mail-kannal—*Poinciana pulcherrima*, India. xxiv, 166.
Main, Th. F. xxviii, 558.
Main-oph-weep—*Datura meteloides*, California. xxvii, 158.
Maine, liquor law. xxv, 387—pharmacy law. xxv, 380, 5.
Mairo-gallol, fr. pyrogallol, Stenhouse and Groves. xxiv, 342.
Maisch, J. M. See also **REPORT ON LEGISLATION AND SECRETARY, PERMANENT**.
 — acid. phosph. dil. xxii, 512, 4—preservat. of alkaloidal sol. xxi, 98—popular health almanac. xxiii, 818—on off-hand analyses. xxx, 655—personal responsibility of assistants. xxii, 473—berberina. xxvi, 892—powd. blue mass. xxii, 528—Chinese blistering beetle. xx, 246—cantharidate potassium. xx, 63—assay of cantharidal preparations. xxi, 647—chloral. xviii, 122; xix, 89, 91; xxi, 657—separation of cinchona alkaloids. xxvi, 900—collect. of leaves of biennial plants. xxi, 621—revision of list of societies obtaining compliment. copies. xix, 99—cosmoline. xxii, 507, 9—cottonroot bark. xxiv, 667—wood-creasote. xx, 66—admission of delegates Michigan Sch. of Ph'y. xix, 28—organizat. entitled to representat. in Am. Ph. Assn. xxi, 31—power of execut. committee to postpone meetings. xxvi, 868, 9—extr. jalap. xix, 116—financial status. xxvii, 775—fld. extr. senega. xix, 115—tannin in gentian. xxix, 504—*Gillenia stipulacea* and *trifoliata*. xviii, 67—glycerin. xviii, 70—keeping of herbs. xix, 122—queries submitted to fourth internat. Congress of Ph'y. xxii, 473—internat. pharmacopœia. xxii, 474, 519—dis-

Maisch, J. M. (Continued.)

- posol of journals. xxvii, 776—life membership. xxv, 498, 9; xxvi, 911—graduated life membership. xxvii, 800—liq. magnesii citratis. xix, 106—liquor dealers' license. xxii, 549—matico, origin. xxiii, 645—maximum doses. xxiii, 806—medicated waters. xix, 107—meeting South. xix, 108; xxvi, 908—pareira. xix, 113—patent-med. and trademarks. xxx, 641—pharmaceut. educat. xix, 96—nomenclature of pharmacopœia xxviii, 547—professors of pharmacy to be pharmacists. xxii, 474—curtailing phonograph. report of minutes. xix, 119—earlier publication of replies to queries. xxi, 42, 82—publication of report of pharmacopœia revision. xxvii, 796, 7—discretionary publication of papers. xxvii, 789—purity of powd. drugs. xxx, 654—adult. of quinia sulphate. xxi, 100—report on legislation and report of Permanent Secretary, see under REPORT—rhubarb. xviii, 99, 101—African saffron. xix, 506—senega. xxix, 521, 2—sneezeweed. xx, 233—thymol. xxx, 617, 9—Veratrum album and viride. xxii, 552.
- discussions: xviii, 45, 46, 47, 52, 53, 65, 67, 70, 71, 78, 84, 96, 97, 99, 101, 109, 110, 112, 113, 116, 122, 123, 124; xix, 25, 29, 53, 61, 67, 69, 73, 75, 77, 81, 82, 87, 88, 89, 91, 96, 98, 99, 102, 103, 105, 106, 107, 108, 109, 110, 113, 115, 116, 118, 119, 120, 122, 125, 126; xx, 25, 28, 53, 57, 60, 62, 63, 65, 66, 67, 68, 73, 75, 76, 77, 88, 96, 97, 99, 102; xxi, 30, 31, 32, 33, 37, 44, 45, 53, 63, 64, 67, 69, 73, 76, 82, 83, 84, 85, 92, 95, 98, 100; xxii, 497, 499, 504, 505, 506, 507, 508, 509, 510, 511, 512, 514, 517, 519, 520, 521, 522, 523, 528, 536, 537, 529, 544, 545, 549, 552, 553, 561, 565, 572; xxiii, 753, 754, 757, 775, 776, 782, 786, 788, 792, 794, 796, 797, 805, 806, 807, 808, 818, 820, 822, 823, 825, 830, 833, 834, 835, 842; xxiv, 573, 574, 606, 655, 656, 657, 659, 660, 661, 662, 663, 664, 666, 667, 669, 672, 676, 677, 678, 679, 680, 683, 684, 685, 687, 688, 690; xxv, 482, 502, 507, 508, 510, 512, 514, 519, 520, 522, 525, 527, 528, 529, 531, 541, 542, 553, 554, 555, 556, 557, 560, 561, 563, 564, 565, 567, 570; xxvi, 879, 881, 885, 888, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 908, 909, 910, 911, 912, 913, 914, 915; xxvii, 759, 760, 786, 787, 791, 794, 796, 797, 800, 801, 802, 803, 806; xxviii, 510, 526, 532, 533, 535, 537, 538, 539, 545, 547, 552, 563, 567, 569, 572; xxix, 504, 505, 515, 516, 518, 521, 522, 523; xxx, 595, 596, 617, 618, 619, 620, 621, 625, 641, 643, 644, 645, 647, 648, 651, 653, 654, 656, 657, 659, 662.
- Maitrank essence**, substit. = tinct. liatris odoratissima, Miller. xxiii, 102—fr. coumarin, Cotzhausen, xxv, 322.
- Maize (INDIAN CORN)**, which also see. Poisonous product of fermentation, Cortez and Husemann. xxviii, 104.
- **STIGMATA (CORN SILK)**, act. due to a peculiar acid, Vauthier. xxix, 121—cause of variable effects, Castan. xxix, 121—water the best menstruum, Vassal. xxx, 147.
- Majith** = *Rubia cordifolia*, India. xxvii, 181.
- Majorana**, loss in drying. xxi, 202.
- Maka** = *Eclipta prostrata*, India. xxv, 157.
- Makhee** = *Asparagus sarmentosus*, India. xxv, 125.
- Makoi** = *Solanum nigrum*, India. xxviii, 120.
- Mal de ojos**, Arg. Republ. xxiv, 762.
- Malacothrix CALIFORNICA**. xix, 303.
- Malai-vémbu (-VÉPPAM)** = *Melia azadirachta*, India. xxvi, 165.
- Malasses-solution** for microscop. exam. of blood, Vulpus. xxvii, 60.
- Malkungée** = *Celastrus paniculata*, India. xxv, 220.
- Mallee scrub** = *Eucalyptus oleosa*, Australia. xxi, 247.
- Mallow, INDIAN** = *Sida epinosa*, Kansas. xxix, 448.
- Malta**, drugs, Watson. xxvi, 167.
- Malt**, determinat. of moisture. xxvii, 136—in California. xxvii, 628.
- Maltin**, saccharifying power, Dubrunfault. xxviii, 363.
- "Maltine extractive,"** Schmidt. xxix, 107.
- Maltose**, convers. into dextrose, Meisel. xxx, 377—difference fr. glucose, Schulze. xxiii, 565—prop., Musculus and Gräber. xxvii, 439—prep. by act. of malt upon starch, Schulze. xxiv, 317; Herzfeld. xxix, 307.
- Malva ANGUSTIFOLIA**, Mexico. xxiv, 777—**ARBORESCENS**, Chili. xxiv, 765—**OFFICINAL**, Arg. Republ. xxiv, 762—**PARVIFLORA**, Morocco. xxiii, 191—**PULCHELLA**, Japan. xxviii, 169.
- **SYLVESTRIS**, loss in drying. xxi, 202—(fruit) uses in India, Dymock. xxvi, 162—in Japan, descript., Holmes. xxviii, 168, 9—in Kansas. xxix, 448.
- Malvaceæ**. xxi, 234; xxiii, 191; xxiv, 166; xxv, 182; xxvi, 252; xxviii, 168; xxx, 217; of California. xix, 300; Kansas xxix, 448; Mexico. xxiv, 777.
- Malvaviscia** = *Lavatera arborea*, Chili. xxiv, 766.
- Malvisco**, Arg. Republ. xxiv, 762.
- Mamma teiga** = *Hyoscyamus albus*, Malta. xxvi, 167.
- Mammee sapota** = vegetable sponge, Bahamas. xxiv, 738.
- Mamuran** = root of *Coptis teeta* and *Thalictrum foliosorum*, India. xxvi, 164.
- Man arabum** = *Manna Alhagi*. xxv, 141.
- Man root** = *Megarrhiza Californica*. xxv, 202; xxvii, 613.
- Man-ken** = *Saccharum spicatum*, China. xxviii, 104.
- Man-to-lo-hwa** = *Datura alba*, China. xxviii, 124.
- Mana hebraica** = *Manna alhagi*. xxv, 141.
- Manacá** = *Franciscea uniflora*, Brazil, therapeut. value. xxix, 137, 373—analysis, Erwin. xxix, 138.
- Manattak kali** = *Solanum nigrum*, India. xxviii, 120.
- Mandara-rengé** = *Datura alba*, Japan. xxviii, 124.
- Mandioca**, see also **MANIHOT UTILISSIMA** and **TAPIOCA**.
- Mandrake**, see **PODOPHYLLUM PELTATUM**.
- Mandubi** (of "POMET"). xxvi, 845.
- Mang-dah-rah-gay** = *Datura alba*, Japan. xxviii, 124.
- Manganese**. xviii, 237; xix, 216; xxi, 296. xxii, 196; xxiii, 286; xxiv, 243; xxv, 257; xxvi, 390; xxvii, 346; xxviii, 241; California. xxvii, 593.
- detect. in ashes, Campani. xxvi, 391—estimat. as protoxide (criticism of exist. methods), Fresenius. xxi, 296; as peroxide, Fresenius. xxi, 297; in ores, Parreno. xxvi, 399; Morawski and Stingle. xxvii, 347—separat. fr. iron in analysis, Beilstein and Jawein. xxviii, 241; as anhydrous sulphide, Classen. xxvi, 391—volatility, Jordan. xxvii, 347—**SALTS** freed fr. cobalt, Muck. xix, 216; act. of ozone, Mailfert. xxx, 259—act. of trimethylamin, Vincent. xxv, 315.
- **ACETATE**, dissolves sulphate of lead, Debbits. xxii, 200.
- **AMIDOSULPHONATE**, Berglund. xxvii, 331.
- **CHLORIDE**, pink color of solut. due to cobalt, Kappers. xxi, 298—pure, fr. chlorine residues, Pizzi. xxvi, 392.
- **ISOVALERIANATE**, Schmidt. xxvii, 458.
- **MALATE**, prep. xxvii, 114.
- **OXIDE** (of Frémy). xxiv, 243—artificial crystals. Gorgen. xxviii, 241.
- **PEROXIDE**, a better estimat. wanted, Phipson. xxiv, 243—estimat. in ores, Scherer and Rumpf. xviii, 237; see also **MANGANESE**, estimation—temperature of reduct. by hydrogen, Müller. xix, 138—regenerated fr. chloride, Jesler. xxiv, 243—saline compounds, Frémy. xxv, 257—much of the commercial is worthless. xxi, 495.
- **SULPHATE**, fluid volume, Candidus. xxvii, 709—Frémy. xxv, 257.
- **SULPHIDE**, constitut. of green and rosé colored, Clermont and Guiot. xxvi, 391.
- **SULPHOCHROMITE**, Græger. xxx, 297.
- **SUPEROXHYDRATE**, Rammelsberg. xxiii, 287.
- **TETRACHLORIDE**, Fischer. xxvii, 346.
- **TUNGSTOBORATE**, Klein. xxx, 302.
- Mangifera INDICA**, in diarrhœa, Lloyd. xxvi, 706—descript., Dymock. xxv, 218.
- Mangrove** = *Rhizophora mangle*, India. xxiv, 736.
- Mani RESIN**, behav. to reagents, Hirschsohn. xxvi, 453-9.

- Manihot GLAZIOVII** yields Ceara rubber. xxvii, 273.
 — **UTILISSIMA**, cultivat. in Brazil. xxv, 237. See also **TAPIOCA**.
Manjishtha=**Madder**, India. xxvii, 181.
Manjit (**MANJITTI SHEVVELLI**)=**Rubia cordifolia**, India. xxvii, 181.
Mann-fruit=root of **Cyperus esculentus**, Orient. xxv, 125.
Manna, adult. xix, 336—drugmarket. xix, 404; xx, 125; xxi, 438; xxiv, 397; xxvii, 560.
 — **ARTIFICIAL**, containing 40 p. c. mannite. xix, 284—prop., Histed. xviii, 288.
 — **ALHAGI**, in Greece. xxv, 140—cont. no mannite. xix, 284.
 — fr. **ARUNDO PHRAGMITIS**, Utah. xxvii, 137.
 — fr. **ASTRAGALUS**, and fr. **ARTAPHRAXIS** cont. no mannite. xix, 284.
 — of the **BIBLE** cont. no mannite. xix, 284.
 — **CALABRINA**, has ceased to exist, Hanbury. xxi, 218.
 — fr. **EUCALYPTUS VIMINALIS**. xxi, 250.
 —, **INSECT**, fr. **Persia** cont. no mannite. xix, 284.
 — **ITALIAN**, product. and account. xxviii, 125.
 — fr. **OAK**;—**ORIENTAL**;—fr. **TAMARISK**;—fr. **WILLOW**, contain no mannite. xix, 284.
Mannate, **FERROUS**, prep., Ghysen. xxi, 356.
Mannite, act. of sulph. ac. and heat, Vignon. xxv, 289—behav. to sulph. ac, bichrom. pot., chlorin. lime, Hamlin, Jr. xxix, 325—and oxalic ac. yield formic acid, Lorin. xxii, 250; xxiv, 318—by dialysis, Genois. xxix, 312—fr. cane sugar, Richter. xxviii, 302—fr. **Laminaria saccharina**, Stenhouse. xxx, 139—in **Penicillium glaucum**, Muntz. xxiii, 122.
 — **ARTIFICIAL**, Hirsh. xviii, 128; xix, 255.
Mannitan, Vignon. xxv, 289.
Mannitol, fr. glucose and invert sugar, Bechamp. xxx, 368.
Manniton, Vignon. xxv, 290.
Mansasi=**Euphorbia nervifolia**, India. xxviii, 192.
Manunu=**Phormium tenax**, New Zealand. xix, 296.
Manzanilla, Arg. Republ. xxiv, 764.
Manzanita=**Arctostaphylos glauca**, California. xxi, 223; xxvi, 698; xxvii, 601=**A. tomentosa**. xxvii, 175.
Mapau=**Myrsine d'Urvillei**, New Zealand. xxiv, 737.
Mara munjel=**Coscinium fenestratum**, India. xxiv, 717.
Maranta. See **ARROWROOT**.
Marantaceæ. xix, 294; xxiii, 136; xxiv, 125; xxvii, 145.
Marathon=**fennel**, Greece. xxv, 170.
Marattia CUCUTÆFOLIA cont. sphaeroids. xxvii, 443.
Marble, California. xxvii, 593.
 — **CEMENT**. xxiii, 114.
Marigold. See **CALENDULA**.
Mariguana=**Cannabis indica**, Mexico. xxiv, 770.
Mariner, G. A. Letter about cinchoquinine. xxii, 646.
Marking nuts=**Anacardium**, India. xxiv, 718.
Markoe, G. F. H., acid, hydrobromic. xxiii, 686—ac. hypophosphorous. xxiv, 626—ac. phosphoric. xxiii, 677, 810, 812; xxx, 652, 3—ac. phosph. cryst. xxiv, 625—annual address. xxiv, 702—inaugural address. xxiii, 768—adulterations. xix, 59—history of Am. Phar. Assn. xxiv, 703—black antimony. xxiv, 650—castile soap. xix, 62—chloral. xviii, 126—cinnamon water. xxiv, 685—citric ointment. xxix, 507—cosmoline and vaseline, rancidity. xxv, 522—diatomaceous earth fr. Richmond. xxi, 101—elixirs. xxi, '91—evaporating dish of block tin. xxiii, 819—ferric hydrate. xxviii, 459—liquor license. xxix, 518—liquor magnes. citr. xix, 532—medicated waters. xxi, 102—metric measures and weights. xxv, 568—microscope. xxv, 565—oil bay. xxv, 435, 542—percolation. xxx, 658—pharmacopœia ('70) report. xxi, 509—pharmacopœia revision. xxiv, 639—**Pyrethrum roseum**. xix, 116—spir. orange. xxi, 91—scammony resin. xxv, 406.
 — discussions; xviii, 63, 64, 66, 122, 123, 124; **Markoe**, G. F. H. (*Continued.*)
 xix, 25, 26, 30, 31, 59, 60, 62, 79, 89, 91, 92, 93, 103, 104, 107, 111, 116, 122; xxi, 66, 70, 71, 75, 76, 78, 86, 88, 91, 92, 101; xxiii, 768, 776, 796, 797, 810, 811, 812, 819, 820, 821, 839, 840; xxiv, 576, 596, 625, 626, 629, 638, 650, 657, 658, 664, 685, 686, 690, 691; xxv, 520, 522, 542, 543, 545, 547, 564, 565, 566, 567, 568, 569; xxvii, 787, 788, 790, 793, 797, 803; xxviii, 509, 510, 535, 536, 550, 557, 570; xxix, 507, 508, 509, 518; xxx, 624, 644, 647, 652, 653, 657, 658, 660, 662, 666.
Maroree=fruit of **Helicteris Isora**, India. xxvi, 165.
Marorphali=fruit of **Helicteris Isora**, India. xxvi, 165.
Marrons (**CHESTNUTS**) cont. no dextrin, Ludwig. xviii, 276.
Marrubia baida=**Marrubium vulgare**, Malta. xxvi, 167.
Marrubium VULGARE, germination of seeds, Saunders. xxx, 567—in Kansas. xxix, 446—in Malta. xxvi, 167.
Marsh gas, see **METHANE**.
Marshmallow, see **ALTHÆA**.
Martinia MONTEVIDEENSIS, Arg. Republ. xxx, 138.
Maru-dampattai=**Myrica sapida**, India. xxviii, 197.
Maruta COTULA, Kansas. xxix, 442.
Marvin, Thos. E. O., cod liver oil. xxiii, 658.
Maryland, pharmacy law, see **BALTIMORE**.
Maschi=arrow poison, Guiana. xxi, 262.
Mashing, more product. in pres. of bisulphite sod. xxii, 226.
Masri=oil olive, Tunis. xxii, 108.
Massachusetts, pharmacy law. xix, 356; xxix, 375; xxx, 477, 492.
Masterwort root (**Imperator. ostruth.**), descript., Holmes. xxv, 172.
 —=**Angelica atropurpurea**, uses by the Indians. xxi, 620.
Mastic, adult. with gum of **Atractylis gummifera**, Landerer. xxiii, 167—beha. to reagents, Hirschsohn. xxvi, 453—fr. **Pistacia lentiscus**. xxvi, 296—yield of volat. oil, Flückiger. xxx, 246, 322—solubilities, Sacc. xix, 310; in eucalyptus oil, Osborne. xxvii, 234—sp. gr., Hager. xxvii, 424.
Masticke (1610). xix, 494.
Mastix-ankathi=gum of **Atractylis gummifera** Greece. xxiii, 167.
Mastruco=several spec. of **Chenopodium**, **Lepidium** and **Senebiera**, Brazil. xxvii, 152.
Mastuerzo, Arg. Republ. xxiv, 762, 3.
Ma-tao-ling=**Aristolochia recurvilabra**, China. xxi, 210.
Matapulga, Arg. Republ. xxiv, 763.
Matches, improved, Ludheim and Toppen. xxviii, 93—in California. xxvii, 628.
Matcho-ya-watu-wawill=dragon's blood, Zanzibar. xxviii, 108.
Maté, analysis, Arata. xxv, 221; xxvi, 300; Byasson. xxvi, 299; Robbins. xxvi, 301—p. c. of ashes, xxii, 137—yield of caffeine, Byasson. xxvi, 300—account and collection, Mantegazza. xxv, 221; Robbins. xxvi, 301, 3.
Materia Medica SYSTEM, Buchheim. xxvii, 129.
 — of U. S., eighty years ago, Saunders. xxvi, 848.
Matezite in Madagascar caoutchouc, Girard. xxii, 249.
Matico, botanical source, Maisch. xxiii, 645; xxiv, 200—drug market. xxviii, 373; xxx, 467.
 — ARG. REPUB. xxiv, 762—**CHILI** (= **Buddleia globosa**). xxiv, 765—**PANAMA** (= **Waltheria glomerata**). xxiii, 222—**QUITO** (**Eupatorium glutinosum**). xxiii, 221, 503.
Matijer=**Leonotis eupatoriæfolia**, India. xxviii, 127.
Matisul=**Leonotis eupatoriæfolia**, India. xxviii, 127.
Matricaria, see **CHAMOMILE**, GERMAN.
 — **DISCOIDEA**, California. xix, 303.
Matruz=several spec. of **Chenopodium**, **Lepidium** and **Senebiera**, Brazil. xxvii, 152.
Matsutake=a Japanese mushroom. xxv, 117.
Matta-pal-tiga=**Batatas paniculata**, India. xxviii, 131.

- Mattison, R. V.** ac. phosph. dil. xxii, 515—ac. salicyl. xxv, 461—granular effervesc. preparat. xxii, 368—letter about opium swindle. xxii, 555, 7—suppositories. xxii, 500, 3; xxiii, 625.
— discussions: xxii, 500, 503, 504, 505, 506, 515, 523, 524, 557, 558, 559; xxiii, 775, 785, 789, 793, 808; xxv, 549, 550.
- Maulbeerholzsäure** of Klaproth is succinic acid, Gmelin. Goldsmith. xxx, 393.
- Ma-ul-khilaf** (Persian) = *Salix capsea*, India. xxviii, 198.
- Mauritius**, plant, Centen. exhibit. xxiv, 741.
- Mau-tan** = *Paeonia moutan*, China. xxviii, 164.
- Mavacuri**—a curare plant, Brit. Guiana. xxvi, 214.
- Mahwa FLOWERS**—*Bassia latifolia*, India. xxiv, 725.
- Maywine essence** (fr. coumarin), Cotzhausen. xxv, 322; (fr. *Liatris odor.*) Miller. xxiii, 102.
- M-ba** = *Elais guineensis*, Africa. xxviii, 105.
- Mboundou** (ordeal poison of Africa), alkaloid diff. fr. strychnia and brucia, Rabuteau and Peyre. xix, 286.
- Mc**, see also **MAC**.
- McCollin, S. Mason**, pepsin. xviii, 73.
— discussion: xviii, 73, 74, 76, 77.
- McElhenie, Thos. D.** xxx, 595.
- McIntyre, E.** xxv, 504.
- McIntyre, W.** Spir. ammon. arom. xxiii, 606.
— discussions: xxiii, 786, 789, 807, 808; xxiv, 667.
- McKelway, G. I.** xxviii, 537; xxx, 597.
- McKesson, John, Jr.**, report, drug market. xix, 388; xx, 114.
— discussion: xix, 75, 76, 95.
- Measures, ACCURACY**, Redwood. xxix, 31.
— **NORMAL**, alloy (irid.-platin). xxiii, 112.
— of pharmacy (decimal), Oldberg. xxi, 577.
— **RULES**, Bedford. xxiii, 112.
— **STANDARD**, material (glass cont. a large proportion of silica) Mohr. xxvii, 38.
- Measurement, APPROXIMATE**, Shuttleworth. xxi, 127.
- Measuring TAP**, self-registering, Dows, Clark & Co. xxii, 47.
— of **TUBES**, construct. and verification, Scheibler. xxix, 32.
- Meat**, yields oxalic ac. by treatment with mur. ac. and chlorate pot., Melckebecke. xxvii, 450—preserved (compressed air) Reynoso. xxiv, 206; (borax, bor. ac.) Herzen. xxiv, 206; (boric ac.) preservat. is due to format. of ac. phosphates, Endemann. xxviii, 228; (powdering) Endemann. xxi, 338; (sulphurous ac. and carbon. oxide) Gamgee. xix, 193; (perchlor. iron) Almén. xxiv, 244.
— **JUICE**, VALENTINE'S, analysis, Forster. xxvi, 151; Taylor. xxii, 71; Tscheppe. xxviii, 53—manufact. xxi, 458.
— **ST. PETERSBURG**, Martenson. xxviii, 72.
— **POWDER**, Dannecy. xxii, 83.
- Mechoacan**, Arg. Republ. xxiv, 763.
- Meconidina**, Hesse. xviii, 262.
- Meconin**, act. of sulphomolybdate ammon., Buckingham. xxi, 369—history. xxi, 373—physiolog. effect, Ott. xxvi, 277.
- Meconoiosin** fr. opium, T. & H. Smith. xxvi, 620.
- Medicago SATIVA**, root adult. of belladonna, descript., Holmes. xxx, 164—in Kansas. xxix, 447.
- Medicinal plants**, see also **DRUGS**.
— cultivated at Victoria, AUSTRALIA. xxi, 201—of CALIFORNIA, Bolander. xix, 297; Steele. xxvi, 698; xxvii, 598—of KANSAS, Brown. xxix, 438.
- Medicine, PORTABLE** (gelatine tablets), Almén. xxi, 126.
- Meen Fun**, Hobb's, analysis, Risser. xxiv, 420.
- Meetiga**—Arabian myrrh, Bombay. xxiv, 197.
- Meetings**: powers of executive committee to postpone, Maisch. xxvi, 868—time and place, Sloan. xxviii, 499; discussion, prolonging to one week. xxii, 541—in the Southern states. xx, 98; Caldwell. xviii, 197; Maisch. xix, 108; xxvi, 908; best time, discussion. xxvi, 908; xxviii, 564, 573; xxx, 664; earlier in the year, Luhn. xxvii, 750; discussion. xxvi, 895.
- Meeting**: xviii (1870), BALTIMORE (Md.), session first, p. 17; second, p. 40; third, p. 79; fourth, p. 97; fifth, p. 106—xix (1871), ST. LOUIS (Miss.), session first, p. 25; second, p. 46; third, p. 70; fourth, p. 82; fifth, p. 99; sixth, p. 112—xx (1872), CLEVELAND (O.), session first, p. 25; second, p. 44; third, p. 59; fourth, p. 67; special, p. 86; fifth, p. 94—xxi (1873), RICHMOND (Va.), session first, p. 25; second, p. 54; third, p. 72; fourth, p. 80; fifth, p. 93—xxii (1874), LOUISVILLE (Ky.), session first, p. 463; second, p. 491; third, p. 506; fourth, p. 518; fifth, p. 537; sixth, p. 551—xxiii (1875), BOSTON (Mass.), session first, p. 737; second, p. 759; third, p. 781; fourth, p. 804; fifth, p. 815; sixth, p. 821—xxiv (1876), PHILADELPHIA (Pa.), session first, p. 569; second, p. 592; third, p. 630; fourth, p. 655; fifth, p. 667; sixth, p. 674; seventh, p. 684—xxv (1877), TORONTO (Canada), session first, p. 473; second, p. 500; third, p. 513; fourth, p. 529; fifth, p. 545; sixth, p. 562—xxvi (1878), ATLANTA (Ga.), session first, p. 839; second, p. 870; third, p. 878; fourth, p. 886; fifth, p. 902; sixth, p. 914—xxvii (1879), INDIANAPOLIS (Ind.), session first, p. 746; second, p. 770; third, p. 785; fourth, p. 792; fifth, p. 798; sixth, p. 804; seventh, p. 805—xxviii (1880), SARATOGA (N. Y.), session first, p. 496; second, p. 511; third, p. 541; fourth, p. 554; fifth, p. 570; sixth, p. 574—xxix (1881), KANSAS CITY (Mo.), session first, p. 478; second, p. 491; third, p. 503; fourth, p. 572; fifth, p. 518—xxx (1882), NIAGARA (N. Y.), session first, p. 582; second, p. 600; third, p. 628; fourth, p. 649.
- Megarrhiza CALIFORNICA**. xxvii, 613—analysis, Heaney. xxv, 27, 201.
— OREGONA, California. xix, 301.
- Megarrhizin**, Heaney. xxv, 27, 202.
- Megarrhizin**, Heaney. xxv, 27, 202.
- Meguri**—*Eulalia japonica*, Japan. xxviii, 104.
- Megusa**—*Mentha austriaca*, Japan. xxviii, 127.
- Mehedi** (MEHUDEE), *Lawsonia alba*, India. xxvii, 238.
- Mekineche**, Turkey. xxiv, 779.
- Mel**, see also **HONEY**.
— **AEERE**—*Manna alhagi*. xxv, 141.
— **ROSAE**, Langlet. xxx, 92—Plevani. xxx, 92—Trembly. xxi, 137.
- Melaleuca CURVIFOLIA**, Australia, yield of oil. xxi, 251.
— **ERICIFOLIA**, Australia. xxiv, 806—yield of oil. xxi, 251.
— **GENISTIFOLIA**;—**M. LINARIFOLIA**, Australia, yield of oil. xxi, 251, 2.
— **PARAGUAYENSIS**, Bonpland. xxviii, 178.
— **SUARROSA**;—**M. UNCINATA**;—**WILSONII**, Australia, yield of oil. xxi, 252.
- Melamine, SULPHOCYANATE**, Claus. xxvi, 372.
- Melanophyll**, Harsten. xxi, 394.
- Melanthaceæ**. xxi, 206; xxii, 99; xxiii, 129; xxvi, 186; xxviii, 106; xxix, 121; xxx, 148; of Mexico. xxiv, 770.
- Melanthigenin** from *Nigella sativa*, Greenish. xxviii, 162.
- Melanthin** fr. *Nigella sativa*, Greenish. xxviii, 162; xxx, 212.
- Melanthium COCHINCHINENSE** cont. sphærocystals in tuber. xxvii, 443—in China. xxviii, 110.
— **VIRGINICUM**, Kansas. xxix, 447.
- Melastomaceæ**. xxvii, 237.
- Mélèze COMMUN**;—**M. D'EUROPE** = *Larix europæa*, D. C. xxvi, 321.
- Melia AZEDARACH**, analysis of rootbark, Jacobs. xxviii, 170—descript. and uses in India, Dymock. xxvi, 165.
— **SUPERBA**, uses of fruit in India, Dymock. xxvi, 159.
- Meliaceæ**. xxii, 155; xxiv, 175; xxviii, 170.
- Melilotus PARVIFLORA**, California. xix, 300; xxvii, 608.
- Melisse CITRONELLE**, France, yields scarcely any oil. xxvii, 384.
- Melitose** found in *Eucalyptus manna*, Johnson. xxi, 250.
- Mellilotol**, Phipson. xxiv, 281.

Mellor and Rittenhouse, statistics of manufacture. xxiv, 536.

Meloe, history, Saunders. xxiv, 510.

— **ANGUSTICOLLIS**. xxiv, 507; — **M. CICHOREI**. xx, 247; — **M. MAJALIS**, Spain. xxii, 169; — **M. PROSCARABÆUS**. xxii, 169.

— **TUCIUS**, in hydrophobia, Arabia. xxvii, 286.

Melons, yield of sugar, California. xxv, 286.

Meloncillo DEL CAMPO, Arg. Republ. xxiv, 762.

Meltsanes - *Solanum melongena*, Greece. xxiv, 65.

Members: care in application, Squibb. xviii, 72—active members in foreign countries. xxv, 572—discussion on ineligibility. xxvii, 757; xxviii, 535—election, change of by-laws necessary. xxvii, 792—expenses per member. xviii, 30—expulsion, discussion. xxv, 513—in arrears not to be allowed to vote, Murray. xviii, 50.

— see also **DISCUSSIONS**; **MOTIONS**; **RESOLUTIONS**.

— **ALPHABETICAL LIST**: xxiv, 878; xxv, 617, and **ADDRESS**. xxvi, 958; xxvii, 869; xxviii, 621; xxix, 573; xxx, 713.

— **DECLINED**: xviii, 341; xix, 591; xx, 346; xxi, 695; xxii, 608; xxiii, 882; xxiv, 894; xxv, 631; xxvi, 982; xxvii, 893; xxviii, 646; xxix, 599; xxx, 741.

— **DROPPED**: xviii, 344; xix, 594; xx, 349; xxi, 698; xxii, 612; xxiii, 886; xxiv, 898; xxv, 636; xxvi, 987; xxvii, 898; xxviii, 651; xxix, 604; xxx, 747.

— **ELICITED**: xviii, 19, 72, 106, 125; xix, 35, 43, 52, 111; xx, 26, 46, 72, 111; xxi, 28, 46, 60, 77, 93, 103; xxii, 465, 494, 522, 566; xxiii, 755, 779, 841; xxiv, 570, 602, 684, 698; xxv, 533, 573, 578; xxvi, 854, 900, 919; xxvii, 762, 794, 804, 815, 811; xxviii, 514, 560, 571, 574, 577; xxix, 503, 512, 519, 527, 530; xxx, 605, 629, 670.

— **HONORARY**: xix, 86; xx, 111, 329; xxi, 677; xxii, 591; xxiii, 863; xxiv, 857; xxv, 576, 597; xxvi, 937; xxvii, 847; xxviii, 599; xxix, 551; xxx, 650, 693, 713.

— **PRESENT**: xviii, 19; xix, 23; xx, 23; xxi, 23; xxii, 23; xxiii, 22; xxiv, 21; xxv, 23; xxvi, 23; xxvii, 23; xxviii, 21; xxix, 23; xxx, 21.

— **RESIGNED**: xviii, 343; xix, 593; xx, 349; xxi, 698; xxii, 611; xxiii, 885; xxiv, 898; xxv, 635; xxvi, 986; xxvii, 898; xxviii, 651; xxix, 604; xxx, 746.

— **ROLL**: xviii, 325; xix, 574; xx, 329; xxi, 677; xxii, 591; xxiii, 863; xxiv, 857; xxv, 597; xxvi, 937; xxvii, 847; xxviii, 599; xxix, 551; xxx, 600.

Membership, increase, discussion. xxii, 521—graded fees. xxvi, 890.

— **REPORT**: xviii, 30; xx, 38; xxi, 47; xxiii, 762; xxiv, 582; xxv, 486; xxvi, 857; xxvii, 765; xxviii, 517; xxix, 415; xxx, 610.

— See also **DISCUSSIONS**; **MOTIONS**; **RESOLUTIONS**.

Membrane, INORGANIC (gelatinous silica), Ullick. xxvii, 315.

Menecrates II. xxv, 476.

Menispermaceae. xxii, 128; xxiii, 179; xxiv, 159; xxvii, 206; xxviii, 160; of Kansas. xxix, 448.

Menispermata, act. of sulphomolybdate ammonia, Buckingham. xxi, 367.

Menispermum CANADENSE is not attacked by *Tinea zea*, Saunders. xxi, 627—in Kansas. xxix, 448.

Menninger, H. J., on retro-active laws. xxv, 510—proprietary titles. xxvi, 904—discretionary publication of papers. xxvii, 789—report on exhibit. xx, 168—army and navy stewards. xxx, 659—treasurer's annual report. xxvii, 781—wholesale and retail druggist. xxx, 627.

— **discussions**: xx, 46, 58, 70, 78, 90, 101, 102; xxi, 37, 52, 67, 68, 69, 78; xxiv, 570, 573, 605, 608, 612, 613, 615, 616, 617, 623, 607, 608; xxv, 508, 511, 513, 514, 517, 518, 528, 529, 530, 531, 535, 536, 537, 539, 546, 547, 556, 569, 577; xxvi, 879, 881, 882, 883, 884, 885, 887, 891, 892, 893, 894, 895, 899, 901, 902, 904, 905, 906, 908, 909, 910, 911, 912, 913, 914, 917; xxvii, 758, 759, 760, 761, 781, 782, 783, 791, 795, 796, 797, 801, 806, 810; xxviii, 509, 510, 511, 532, 533, 535, 539, 540, 541, 544, 545, 553, 567, 569; xxix, 506, 511, 520; xxx, 595, 596,

Menninger, H. J. (Continued.)

597, 600, 624, 626, 627, 628, 633, 635, 636, 637, 641, 648, 659, 660, 661, 662, 663, 665, 666.

Menta DE CASTILLA, Arg. Republ. xxiv, 763—**M. NEGRA**, Arg. Republ. xxiv, 762.

Mentha ARVENSIS var. **JAVANICA** and var. **VULGARIS**, Japan. xxviii, 127, 8, 266.

— **AUSTRALIS**, Australia, yield of oil. xxi, 219.

— **AUSTRIACA**, Japan, descript., Holmes. xxviii, 127.

— **CANADENSIS**, California. xix, 304—Kansas. xxix, 446.

— **CITRATA**, Chili, xxiv, 766.

— **GRACILIS**; — **M. GRANDIFLORA**, Australia, yield of oil. xxi, 219.

— **JAVANICA**, Japan, xxiii, 120.

— **PIPERITA**, see **PEPPERMINT**.

— **VIRIDIS** in Kansas. xxix, 446. See also **SPEARMINT**.

Menthene fr. cryst. Japan oil of camphor, Beckett and Wright. xxiv, 270—prop., Atkinson and Yoshida. xxx, 327.

Menthol, see also **OIL PEPPERMINT, JAPANESE**.

— as anti-neuralgic and antiseptic. xxviii, 266—color reactions, Konow. xxvi, 434—drug market. xxviii, 374; xxix, 373—prop., Atkinson and Yoshida. xxx, 326.

Menthone fr. menthol, Atkinson and Yoshida. xxx, 327.

Mentruz. several spec. of *Chenopodium*, *Lepidium*, *Senebiera*, Brazil. xxvii, 152.

Men-tung—*Ophiopogon japonicus*? China. xxviii, 204.

Menyanthes TRIFOLIATA, see **BUCK BEAN**.

Menyanthin, detect. in beer, Wittstein. xxiii, 341; Dragendorff. xxx, 339; Haefstedt. xxii, 227.

Mep-no-me—*Prunus armeniaca*, Japan. xxviii, 179.

Mercaptan fr. alc. and hyposulphite sodium, Ott. xix, 243.

Mercein, J. R. Home-made chemicals. xxii, 427; xxvi, 789—pharmaceutical legislation in New Jersey. xxiii, 551—letter about his report on the progress of pharmacy. xxi, 44—report on progress of pharmacy. xxi, 125.

— discussion: xxiii, 781, 786.

Mercrethyl, CHLORIDE, (as substit. for corros. sublimate, does not precip. albumen) history, Maisch. xxii, 229.

Mercurialis ANNUUS, Arg. Republ. xxiv, 764.

Mercury. xviii, 242; xix, 208; xxi, 313; xxii, 206; xxiii, 306; xxiv, 200; xxv, 260; xxvi, 416; xxvii, 368; xxviii, 251; xxix, 270; xxx, 305.

— in Borneo. xviii, 242—California. xxvii, 593, 5, 654.

— act. of nitric acid, Acworth. xxiv, 209; of permangan. pot., Kirchmann. xxi, 314; of sulphur and iodine vapors, Schrötter. xxi, 313—drug market. xix, 394; xx, 125; xxi, 430; xxii, 630; xxiv, 398; xxv, 350; xxvi, 656; xxvii, 560; xxviii, 373; xxix, 373; xxx, 467—dispensing vessel ("spritz") Leiner. xxi, 154—distillation (automat. syphon arrangement) Weber. xxviii, 251—estimat. in organic fluids, Hager. xxix, 278; in urine and faeces, Mayençon and Bergeret. xxii, 206; xxiii, 307—extracted by bromine, Wagner. xxiv, 218—occurrence, extraction, etc. xxvii, 368—filtrat. (chamois) Pfandler. xxviii, 251—injurious effect in looking-glass fact. obviated by ammonia, Meyer. xxii, 206—spontaneous oxidat. on exposure to the air, Berthelot. xxx, 305—**PURIFICAT.** (chrom. ac.) Brühl. xxvii, 370; xxviii, 251; (nitric ac.) Leeds. xxiii, 306; (ferric chloride) Meyer. xxvii, 369; (paper filter) Vulpius. xxvii, 371—reduction (chlor. copp., hyposulphite sod.) Paterna. xxvi, 416; in California (chlor. copp., zinc amalgam) Sieveking. xxvi, 416—sp. gr., Mullet. xxvi, 417—**TEST**: (copper powd., gold disk) Biswend. xxix, 276; (copper, nitr. silver) Merget. xxx, 305; (vapor on cold gold) Teuber. xxviii, 251; xxix, 277—**SALTS**, act. of light, Schnauss. xxiii, 308; act. of ozone, Mailfert. xxx, 258; of trimethylamine, Vincent. xxv, 316.

- Mercury AMALGAM** with hydrogen, Læw. xix, 177.
 — **ACETATE**, double salt with pyrophosph. sodium, Lefort. xxi, 314.
 — **ALBUMINATE**, soluble, Drees. xxviii, 357—Bamberger. xxiv, 389.
 — **AMMONIATED**, adult. (gypsum) Stoddart. xxii, 315—act. of iodine and alc., Schwarzenberg and Flückiger. xxiv, 261, 2.
 — **BICHLORIDE**. See **CORROSIVE SUBLIMATE**.
 — **BROMIDE**, act. of ozone, Mailfert. xxx, 258.
 — and **CHALK**, prep., Bibby (sugar of milk for part of chalk). xxiv, 93; Bottle (in a bottle by shaking). xxv, 96—is likely to contain red oxide, Hendricks. xxvii, 105.
 — **CHLORIDE**, MILD. See **CALOMEL**.
 — and **COBALT**, **SULPHOCYANIDE**, Skey. xxiii, 267.
 — **CYANIDE**, as test for glucose, Knapp. xviii, 269; xix, 256.
 — **FULMINATE**, act. of ammonia, Steiner. xxiv, 233.
 — and **MOLYBDENUM SULPHOCYANIDE**, Skey. xxiii, 267.
 — and **MORPHIA OLEATE**, Rice. xxi, 350.
 — **NITRATE**, act. of ozone, Mailfert. xxx, 258—prep., Phar. Soc., Paris. xxvi, 421.
 — **IODATE**, solubility in various salts, Cameron. xxiv, 263.
 — **IODIDE**, BIN-, (red), cost of home-made, Fredigke. xx, 206—hypodermic solut., Powers. xxvii, 93—recovering iodine, Henry. xviii, 222—correct melting point; solubility, Köhler. xxviii, 253—prep., Mitchell (fr. nitrate). xxiv, 262; Williams (with chlor. ammon.). xxi, 315—solubility in glycerin, Farten. xxviii, 285.
 — **IODIDE**, **PROTO-**, (green, yellow), freed fr. bin-iodide, Williams. xxi, 315—cryst., prep., Yvon. xxii, 206—home-made, cost, Fredigke. xx, 206—always cont. metallic mercury, Schlagdenhauffen. xxvi, 420—optical prop., Cloizeaux. xxvi, 420—prep. (alc. till distinguished, then iodine), LeCanu. xxvi, 421; (very cold mortar, and not mixed dry), Lloyd. xxviii, 252—pure, Lefort (iod. pot., pyrophosph. sod., acet. merc.). xxi, 314.
 — **IODIDES**, **DOUBLE**, with mercury and with silver, mutation of color, Mensel. xix, 191.
 — and **IRON SULPHOCYANIDE**, Skey. xxiii, 267.
 — **OLEATE**, Wolff. xxvii, 429—instability (best prep. fr. metallic mercury), Clevenger. xxx, 361—prep., Dohme (oleate potassium and nitr. merc.). xxi, 350; Gerrard. xxi, 348; Hilger. xxiii, 356; MacLagan. xxi, 349; Remington. xxv, 521; Rice. xxi, 349, xxii, 462; Rosenwasser. xxix, 305; Squibb. xxv, 521, 3; Thompson. xxv, 415; Wolff. xxx, 360.
 — **OXIDE**, **RED**, contamin. with lime, Godeffroy. xxii, 315—temperat. of reduct. by hydrogen, Müller. xix, 138—prep. (mercury and permang. pot.), Kirchman. xxi, 314—soluble in iod. pot., Jehn. xxi, 314.
 — **OXIDE**, **YELLOW**, contamin. with calomel (7 p. c.), Bernbeck. xxx, 306—cause of diff. in color, Comere. xxx, 306—prep., Gille (lime-water). xxvi, 417; Mitchell (soda). xxiv, 263.
 — **PROTOSULPHIDE**, **HYDRO-ERYTHRITE**, Thompson. xxvi, 364.
 — **RICINOLEATE**, Giffard. xxvi, 145.
 — **SALICYLATE**, neutral, Ladoux; Grandval. xxx, 390.
 — **SELENATE**, Cameron and Davy. xxx, 269.
 — **SELENO-CYANIDE**, Cameron and Davy. xxx, 269.
 — and **SODIUM CHLORIDE**, act. therapeut. quicker than corros. sublimate, Stern. xix, 209—does not coagul. albumen, Müller. xix, 209.
 — **SULPHATE**, act. of ozone, Mailfert. xxx, 258.
 — **SULPHIDE**, **BLACK**, Dannenberg. xxv, 266.
 — **SULPHIDE**, **RED**, see **VERMILLION** and **CINNABAR**.
Mercuryweed = *Acalypha virginiana*, Kansas. xxix, 445.
Merrill, W. S., report on Cincinnati drug market. xxi, 447.
Mertensia PEDALIS, Chili. xxiv, 765.
Mescal fr. *Agave deserti*, Arizona. xxiii, 135; xxvii, 143.
Mesembryanthaceæ. xxvii, 227.
Mesembryanthemum ACINACIFORME, California. xxvii, 227—**M. DIMIDIATUM**, California. xix, 300.
Mesitylen-chinon as acidimetric test, Fittig. xxii, 276.
Messmate tree = *Eucalyptus fissilis*, Australia. xxi, 249.
Mesquite, see **MEZQUITE**.
Mesua FERRERA, India, descript., Dymock. xxv, 183.
Metachloral, Richardson. xix, 247.
Metals, fancy colors—(sulphide lead), Puscher. xxi, 125.
 —, poisonous quality in direct ratio to the increase of atomic weight, Rabuteau. xxiv, 264.
 —, **OLEOMARGARATES**, Phar. Soc., Paris. xxvi, 145.
Metallic CHLORIDES reduced by magnesium. xix, 205.
 — **OXIDES**, temperature of reduction by hydrogen; Müller. xviii, 217; xix, 138.
 — surfaces, tarnish prevented (paraffin), Puscher. xix, 175.
 — salts, antidote, Jandousch. xxviii, 91.
Meta-morphia, history. xxi, 376.
Metanethol, constitut., Perrenoud. xxvi, 444.
Meteorological REPORTS and **MAPS**, uses. xx, 304.
Meter, **STANDARD**, Markoe. xxv, 567.
Methane, generation, Schorlemmer. xxii, 209.
Methonia SUPERBA, India, descript., Dymock. xxvi, 158.
Methyl-alcohol, see **ALCOHOL**, **METHYLIC**.
Methylammonium, **CHLORIDE**, fr. caffeine. xix, 283.
Methyl-anthracene fr. aloxanthin, Tilden. xxvi, 615.
 — **CHLORIDE**, fr. beetroot molasses, Vincent. xxviii, 263—for extracting perfumes, Vincent. xxviii, 263.
 — **CONIA**, synthesis, Michael and Gundelach. xxx, 439.
 — **ISOPROPYLCARBINOL**, constitution. xxvii, 413.
 — **ISOVALERIANATE**, Schmidt. xxvii, 459.
 — **MORPHIA "α"** (or, mono-methyl-morphia) is identical with codeia, Hesse. xxx, 402.
 — **MORPHIA "β"** is identical with "α," Dott. xxx, 402—and with dimethyl-morphia, Hesse. xxx, 402.
 — **NITRATE**, explosiveness lessened by alc., acetone, etc., Girard. xxiv, 294—replaces iodide of methyl in the manufact. of anilin colors. xxiv, 294.
 — **ORANGE** in acidimetry, Lunge. xxx, 442—synonyms. xxx, 442.
 — **OXIDE**, act. of mur. ac., Friedel. xxiv, 293.
 — **PELLETIERINA**, Tanret. xxviii, 342.
 — **PROPYLCARBINOL**, constitution. xxvii, 412.
 — **SALICYLATE** fr. artif. salicyl. ac., Williams. xxiii, 351.
 — **TETROXY-ANTHRAQUINONE** = aloxanthin, Tilden. xxvi, 615.
Methylene, **BICHLORIDE** is unsafe as anæsthetic, Richardson. xviii, 251.
 — **CHLORIDE**, prep., Greene. xxix, 298.
 — **IODIDE** (of Butlerow) is chloroform and iodine, Gautier. xix, 252.
Methyscophyllum GLAUCUM, South Africa, descript., Jackson. xxii, 158.
Methysticin fr. Kava-kava, Cuzent. xxv, 27.
Metric system adoption in most countries. xxvii, 27—by U. S. Marine Service. xxvii, 25, 37—advantages and disadvantages. xxvii, 26.
 — discussion. xxiv, 606; xxvi, 887—objections, Pierce. xxiv, 607—Sharples. xxiv, 607—Wiegand. xxiv, 427—progress, Brooks. xxiii, 566—publications. xxiv, 426.
 — **ASSYRIAN**. xxv, 35.
 — **WEIGHTS** in prescript., difficulty solved, Maisch. xxv, 35.
Mexico, chemicals, Centen. exhibit. xxiv, 797—drugs, Centen. exhibit. xxiv, 767.
Meyer, C. F. G. xix, 100.
Meyers, J. A. xviii, 76, 77, 78.
Mezcal, see **MESCAL**.
Mezereon, active principle an anhydride of an

Mezereon. (*Continued.*)

- acid, Buchheim. xxii, 34—constituents, Buchheim. xxii, 101—detect. in beer, Dragendorff. xxx, 340—analysis of unripe fruit, Casselmann. xix, 292—uses in Morocco. xxiii, 140.
- Mezquite gum**, fr. *Prosopis dulcis*, Mexico. xxiv, 776—adult. (wattle gum) xxiii, 500—analysis, Alexander. xxiii, 651—almost identical with gum arabic, Kalteyer. xxi, 255—account, Miller. xxiii, 647; xxiv, 192—as food. xxiii, 653—reactions, Miller. xxiii, 652—its tannin, Bidwell; Maisch. xxiii, 805.
- Michaelmas daisy** = *Aster tradescanti*, Kansas. xxix, 442.
- Michelia CHAMPACA**, India, as febrifuge. xxiii, 119—descript. xxi, 233; Dymock. xxv, 174—*M. RHEDII*, India. xxi, 233.
- Michigan**, adulteration law. xxix, 378, 396—pharmacy law. xix, 356; xxv, 394—school of pharmacy, objection to admission of delegates. xix, 29.
- Micromeria DOUGLASII**, California. xix, 304; xxvi, 698; xxvii, 164, 613.
- Microprismatic ANALYSIS**, Maschke. xxx, 54.
- Microhynchus SARMENTOSUS**, India, descript., Dymock. xxv, 158.
- Microscope**, Hoffmann. xviii, 299, 304—discussion. xxiv, 679; xxv, 565—Markoe. xxv, 565.—**PREPARATIONS**, stains (perosmic and oxalic ac.). Boericke. xxvii, 60.
- Microsublimation of alkaloids**, Blyth. xxvii, 483—(unreliable, Köhler. xviii, 291; Sedgwick. xviii, 292.)
- Microtome**, Schneider. xxix, 52.
- Microzymes** fr. beef pancreas, yield and act., Béchamp. xxix, 368.
- Midsummer root**, China. xxiv, 747, 760; = *Pinellia tuberifera*. xxviii, 102.
- Mignonette**, cultivat. in Australia. xxviii, 100—in France. xxvii, 382.
- Mih-mun-tung** = *Ophiopogon japonicus*, China. xxviii, 204.
- Mikania AMARA**; —*M. ARGYROSTIGMA*; —*M. GUACO*, synonyms and uses in South America; —*M. HUAKO*. xxix, 157, 8.—*SATUREJÆFOLIA*. xxviii, 148—*M. TAFALLANA*. xxix, 158. See also *GUACO*.
- Milhan, J.**, portrait. xxiv; discussions. xviii, 47, 66.
- Milk**, adult. xxi, 502—and their detect. by analysis, Sharples. xxiv, 515—cause of blue color, Neelson. xxx, 452—analysis, Adams. xxvii, 536; Baumhauer. xxv, 324; Cameron. xxiii, 235, 6; Ritthausen. xxvi, 628—milk sugar is not necessary to its coagulation by rennet, Hammarsten. xxiii, 237—estimat. of casein and fat, Lehmann. xxvi, 629; Manette and Musso. xxvi, 629—estimation of solids, Bering. xxvii, 536; Magnier, difficulties. xxv, 324; of sugar. xxvii, 536—extraction of fat, Wanklyn. xxii, 285—alcoh. fermentation, Reichardt. xxiii, 339; condit. necessary, Richet. xxvi, 461—react. with tinct. guaiac due to ozone, Arnold. xxx, 452—masks the iodine starch react., Hager. xxii, 244—cont. kreatin, Commaile. xviii, 268—preservative in lead poisoning, Didierjean. xix, 212—microscop. examin., Zöller. xxiii, 521—yields oxalic ac., with mur. ac. and pot. chlor., Melckebecke. xxvii, 450—cont. ozone, Arnold. xxx, 452—determinat. of purity (alcohol), Sacc. xxii, 286 (not reliable, Merklen. xxii, 286)—preserved by boric ac., Hirschberg. xxi, 269; Polli. xxiii, 236; by oil mustard, Schwalbe. xxiii, 233.—**of ASAFÆTIDA**, see **MIXTURE**, **ASAFÆTIDA**.—**of BONE**, Dutch Phar. Soc. xxx, 100.—**CONDENSED**, analysis of several brands, Gerber. xxvii, 117; Kofler. xix, 167—estimat. of fat, Wien. xxix, 359—manuf. and statistics. xxi, 167—food value, Hoffmann. xxi, 167—compared to woman's milk. xxvi, 627.—**GOAT'S**, condensed, analysis, Godeffroy. xxviii, 54.—**IODATED**. xviii, 213—Dutch Phar. Soc. xxx, 100.—**of IRON**. xxv, 93—Dutch Phar. Soc. xxx, 100.—**MOTHER'S**, substitute, Martiny. xxiv, 111.—**of SULPHUR**. See **SULPHUR**, **PRECIPITATED**.
- Milk sugar**, act. of baryta, Reichardt. xix, 257; of dilut. sulph. ac., Fudakowski. xxiv, 318—alcohol. fermentat., Reichardt. xxiii, 339—anhydrous, Schmöger. xxix, 311—decompos. by permang. pot., Laubenheimer. xxi, 355—identical with arabinose, Kiliani. xxix, 311—lactic fermentation, Richet. xxvii, 461—laxative prop., Taube. xxix, 311—manufacture in Switzerland, Sauter. xxv, 289—in U. S. Lemberger. xx, 245; xxix, 436; Lenggenhager. xxviii, 300; Osann. xxix, 437; discussion. xxix, 509—in fruit of *Sapodilla*. xxx, 369—reduces alkaline solut. copper, Rodewald and Tollens. xxvii, 447—partial synthesis, Demole. xxviii, 300—yield. xxix, 510.
- Milk weed**, **TRUMPET**, —*Lactuca elongata*, Kansas. xxix, 442.
- Mill**. See **DRUG MILL**.
- Milla CAPITATA** var. **PAUCIFLORA**, Arizona. xxvii, 283.
- Millefolium**, loss in drying. xxi, 202.
- Miller, A. W.** Letter about Centennial fund. xxv, 481—chemicals in U. S. xxiv, 533—confect. senna. xxv, 398—cosmoline. xxii, 509, 510—packing herbs. xxiii, 572—American extr. licorice. xxii, 394—mezquite gum. xxiii, 647—report on adulteration. xxiii, 494—report on exhibit. xxi, 451—spice-bush berries. xxvi, 772.—**discussions**: xxii, 499, 508, 509, 510, 520; xxiii, 780, 792, 793, 823, 836, 838, 840; xxvii, 760.
- Millet** (**SETARIA**), fermented beverage, China. xxv, 235.
- Milling** (**DRUG-**) in Canada. xxv, 336.
- Millium LENDIGERUM**, Calif. xxvii, 605.
- Millon's base**—Mercury, nitroso-nitrate. xxix, 256.
- Mimosa SCANDENS**, Manila. xxiv, 767.
- Mimulus CARDINALIS**, Calif. xix, 304; —*M. GLUTINOSUS*, Calif. xxvi, 698; xxvii, 609; —*M. INCONSPICUUS*; —*M. LUTEUS*; —*M. MOSCHATUS*, Calif. xix, 304.
- Minargent**, comp. xxviii, 357.
- Minderer's spirit**. See **LIQ. AMMON. ACET.**
- Minerals**, **FLUX** (sodium) Schonn. xix, 142—test for **PHOSPH. AC.** (sodium) Bunsen. xviii, 226—California. xxvii, 585.
- Minim pipette**, Squibb. xxi, 543, 4.
- Mingut**—*Euphorbia nervifolia*, India. xxviii, 192.
- Mining**, **HYDRAULIC**; —**PLACER**, California. xxvii, 589.
- Minnesota**, pharmacy law. xxx, 478, 493.
- Mint**, **CURLED**, loss in drying. xxi, 202—*M. WILD*—*Mentha canadensis*, Kansas. xxix, 446.
- Minutes** (of **MEETINGS**), full publication or only partial, discussion. xx, 69, 70, 71.—**and DISCUSSIONS**, difference, Judge. xxiv, 667.
- Mio-mio**—*Baccharis cordifolia*, Brazil. xxviii, 148.
- Mirio**, India, (a *Lauracea*) descript., Dymock. xxvi, 164.
- Mishmee teeta**—*Coptis teeta*, India. xxiv, 724.
- Misodendron MACROPHYLLUM**, Chili. xxiv, 765.
- Mispale**—*Buddleia verticillata*, Mexico. xxiv, 772.
- Mississippi**, pharmacy law. xxviii, 582.
- Missouri**, law against articles of immoral use. xxiv, 435—pharmacy law. xxvii, 616, 666; xxii, 331, 3; xxix, 376, 385; xxx, 478.
- Mistakes and ACCIDENTS**. xxi, 504.
- Mistletoe**, see also **PHORADENDRON FLAVESCENS** and **VISCUM ALBUM**.—**AMERICAN** is *Phoradendron flavescens*, and not *Viscum album*, Crosier. xxvi, 247—as oxytotic superior to ergot, Long. xxvi, 246.
- "Mistura"** proposed for **"INFUSUM,"** Symes. xxiii, 70.
- Misuktjinasi**—*Gardenia florida*, Japan. xxviii, 157.
- Mitchell, Chas. L.**, ergotin. xxiv, 465—active principle of the off. veratrums. xxii, 397.
- Mitchella REPENS** substit. by *Gaultheria procumbens*. xxiii, 501.
- Mixer** (horizontal), Rice. xxix, 35.
- Mixtures**, drop equivalent, Talbot. xxix, 34.—**INFLAMMABLE**. xix, 169.
- Mixture**, **ACID SALICYLIC**, Maury; Wunderlich. xxiv, 85.—**ALOES CO.**, King's Co. Med. Soc. xxvi, 149.—**AMMONIAC, CONC.**, Wood. xxiii, 77.

Mixture. (Continued.)

- AMMON. PICRATE. xxvii, 96.
- ANTIPRURITIES, Scholz (with tinct. caladin. seq.). xxvi, 126.
- ANTIRHEUMATIC, Philadelphia Hospital. xxiv, 84.
- ANTISEPTIC, PENNES. xxx, 99.
- ANTISPASMODICA, CONC. xxv, 93.
- APII COMP., Hammond. xxx, 99.
- ARSENICAL COMP., Philadelphia Hosp. xxiv, 84.
- ARTICHOKE LEAVES, Copeman. xxiii, 81.
- ASAFŒTIDA, CONC. (dilut. acet. ac.), Ackermann. xxii, 68—Robbins (glycerin). xxi, 171—Wood (glycerin). xxiii, 76.
- ASTRINGENT, Philadelphia Hosp. xxiv, 84.
- BASHAM, Wiegand. xxv, 93—Philadelphia Hosp. xxiv, 84.
- CASTOR OIL, see EMULSION, CASTOR OIL and OIL CASTOR, ADMINISTRATION.
- CHLORATE, Hancock. xxii, 338.
- CHLOROFORM, Landerer. xxiii, 77—Murdock. xxi, 133.
- CINCHONÆ, Symes. xxiii, 70.
- COD-LIVER OIL (catsup, extr. beef), Fairthorne. xxix, 84. See also EMULSION, COD-LIVER OIL.
- COLOMBO, Symes. xxiii, 70.
- CONII, FERRI, etc., Tully. xxvii, 95.
- COSMETIC, Philadelphia Hosp. xxiv, 84.
- CHALK (dry powder), Jones. xix, 149; Rother. xxii, 68—(glycerin), Kennedy. xxi, 134; Reynolds. xix, 149.
- CHALK, COMP., Philadelphia Hosp. xxiv, 84.
- CYNARA SCHOLYMUS, Copeman. xxiii, 81.
- FERRI CHLORIDI COMP., Philadelphia Hosp. xxiv, 84.
- FERRI et QUINÆ, Philadelphia Hosp. xxiv, 84.
- GENTIAN and IRON (Meigs), Fairthorne. xxix, 86.
- GLYCYRRHIZÆ COMP., Arthur. xxiv, 82; Bibby. xxiv, 82; Brown. xxv, 91; Neynaber. xxiv, 82; Rice. xxvi, 126; Wilder. xxiii, 78.
- GUAIAIC, Ph. Brit., Greenish. xxv, 92—Squire. xxvii, 95.
- GUAIAIC, GREEN, xxvi, 125.
- CONT. IODINE and ESSENT. OILS, Wilder. xxvii, 96.
- CONT. IODINE and TANNIN, Wilder. xxvii, 96.
- NEUTRAL, Fairthorne. xxix, 76.
- PHOSPHORUS (carbon trichloride), Polk. xxvii, 95.
- RHUBARB COMP., Symes. xxiii, 70.
- SALINE, Gross. xxvii, 95.
- SODA, Philadelphia Hosp. xxiv, 84.
- SODA COMP., Philadelphia Hosp. xxiv, 84.
- SPLEEN, GADBERRY'S. xxvii, 96.
- TRIMETHYLAMIN, Spencer. xxiii, 81.
- VILLATE'S. xxiii, 80.
- ZOLLIKOFFER, Philadelphia Hosp. xxiv, 84.
- Mochurrus** = Areca catechu, India. xxiv, 718.
- Modira coniram** = Strychnos colubrina, India. xxviii, 136.
- Moghli erendi** = Jatropha curcas, India. xxv, 226.
- Mohr, Char.**, damiana. xxiv, 679—Eriodictyon californicum, analysis. xxvii, 736—Pycnanthemum linifolium. xxiv, 512—report on exhibit. xxvi, 698—co-operat. fluid extracts. xxvi, 696 table.
- discussions. xxiv, 679; xxvi, 900.
- Moith, A. Th.**, artif. mineral waters. xix, 483.
- Moheack SUNFLOWER** = Helianthus annuus, Calif. xxvii, 178.
- Molasses**, often cont. mur. ac., oxide tin, sulph. ac. xxi, 503—test for glucose, Casamajor. xxx, 377.
- Molle**, Arg. Republ. xxiv, 762.
- Mollisine**, Bakes. xxviii, 44.
- CARBOLIZED, Bakes. xxviii, 44.
- Mollugo VERTICILLATA**, Kansas. xxix, 441.
- Molybdenum**. xxii, 201; xxiii, 299; xxiv, 255; xxvi, 406; xxvii, 358; xxx, 302.
- atomic weight, Liechti and Kempe. xxii, 202.
- CHLORIDE (TETRA-), Liechti and Kempe. xxii, 201.
- and MERCURY SULPHOCYANIDE, Skey. xxiii, 267.
- Momi** = Amygdalus nana, Japan. xxviii, 179.
- Momordica CHARANTIA**, India, descript., Dymock. xxvii, 228.

Momordica ELATERIUM, see ELATERIUM.**Momu** = Amygdalus persica, Japan. xxviii, 179.**Monarda FISTULOSA**, Kansas. xxix, 446—M. PUNCTATA substit. by Pycnanthemum incanum. xxiii, 502—in Kansas. xxix, 446.**Monas PRODIGIOSA**, Helm. xxiii, 124, 459.

— RED, Helm. xxiii, 124, 459.

Mondo = Ophiopogon japonicus, Japan. xxviii, 204.**Mongumo BARK** (= Ochrosia borbonica?), Madagascar, descript., Holmes. xxvii, 170—analysis, Dragendorff. xxvii, 171.**Moniminaceæ**. xxi, 262; xxiii, 227.**Monk's head**, amount of sugar in nectar, Wilson. xxvii, 442.**Monniera TRIFOLIA**, Brazil. xxiv, 162.**Monninia POLYSTACHYA**, Brazil. xxvii, 218.**Monninia**, fr. Monninia polystachya. xxvii, 218.**Monochlorethylen**, CHLORIDE, comp., boil. point; anæsthetic without infl. on respir. and circulat., Taube. xxix, 293.**Monochlorethylidene**, CHLORIDE, Taube. xxix, 293.**Monomethyl-morphia**, ident. with codeia, Hesse. xxx, 402.**Monomethylnor-narcotina**, history. xxi, 373.**Monodora GRANDIFLORA**, Africa, descript. of seeds, Möller. xxix, 115.**Monotropa UNIFLORA**, Kansas. xxix, 444.**Montanea TOMENTOSA**, Mexico. xxiv, 774.**Mooi-cha-gond** = gum of Odina wodier, India. xxv, 220.**Moondi** = Sphæranthus mollis, India. xxvi, 160.**Moonseed** = Menispermum canadense, Kansas. xxix, 448.**Moore, J. F.**, elixirs. xxii, 561—liquor license. xxii, 546, 9—on nominating. xxviii, 558—revision of pharmacopœia. xxiv, 638, 650—president *pro tem.* xix, 25—on substitution. xx, 82.

— discussions: xix, 25, 26, 32, 46, 87; xx, 29, 52, 69, 70, 71, 72, 75, 80, 82, 83, 85, 88, 98; xxii, 504, 509, 520, 521, 522, 524, 526, 534, 544, 546, 549, 561; xxiv, 638, 650, 658; xxviii, 558, 562, 563, 570.

Moorkalee gum, India. xxiv, 719.**Mooslie kala**, India. xxiv, 724.

— seeah = Murdannia scapiflora, India. xxiv, 724.

Moota cottan = Cardiospermum halicacalum, India. xxvi, 166.**Moreton Bay cheatnut** = Castanospermum australe. xxv, 130.**Morgyricarpus SETOSUS**, Chili. xxiv, 766.**Morinda CITRIFOLIA**, cultivat., India. xxiv, 716—descript., Dymock. xxv, 163.

— TOMENTOSA, India, descript., Dymock. xxv, 163.

Moringa PTERYGOSPERMA, India, react. of gum, Masing. xxix, 213—descript., Dymock. xxv, 210—in Jamaica. xxiv, 732.**Morning glory**, BLUE, = Ipomœa nil;—M. PURPLE, = Ipomœa purpurea, Kansas. xxix, 443.**Moro MULTICAULIS**, Arg. Republ. xxiv, 762.**Morocco**, drugs, Leared and Holmes. xxiii, 121; xxiv, 114.**Morphia**, is not originally contained in the juice, Hesse. xxi, 243—ACTION of ammon. sol. of copper, Nadler. xviii, 394; of arseniate sod., Tattersall. xxviii, 324, 5; of ferric chlor., butter antimony, stannous chlor., Godeffroy. xxvi, 559; of ferricyan. and permang. pot., Polstorff. xxviii, 322; of light, Flückiger. xxvi, 577; of succinic, camphoric, tart., oxal. ac. at elevat. temp., Beckett and Wright. xxiv, 342; of sugar and sulph. ac., Schneider. xxi, 368; of sulphomolybdate ammon., Buckingham. xxi, 369; of sulph. ac., bichrom. pot., chlorin. lime, Hamlin, Jr. xxix, 325—is not an antidote to atropia, Knapstein. xxvii, 508—is a phenol, Chastaing. xxx, 400—conversion into codeia, Grimaux; Hesse. xxx, 401—drug market. xx, 117; xxi, 431; xxii, 637; xxiv, 396; xxv, 346; xxvi, 650; xxvii, 553, 560, 566, 567; xxviii, 374; xxix, 373; xxx, 467—ESTIMAT., Fordos, yield. xxviii, 323; Hays, xxvii, 484; Hoglan. xxviii, 323; Pellagri. xxvi, 561—Petit, yield. xxviii, 323;

Morphia (*Continued.*)

- Rother. xxviii, 323; Staples, yield. xxviii, 323; Thresh. xxviii, 320—see also OPIUM, ASSAY—history. xxi, 373—incompatible with hydrocyanic acid, Maisch. xix, 225—isolated (bicarb. pot.), Guhl. xxiii, 392; from viscera, Selmi. xxvii, 483—micro-subliming point, Blyth. xxvii, 483—physiolog. act., Ott. xxvi, 277—SOLUB. in alcohol, Lafean. xxix, 324; Lloyd. xxx, 403; and chlorof., Burg. xxviii, 322; chloralhydrate, Fairthorne. xxiii, 345; oil, by glac. acet. ac., Barnes. xxiv, 343; water, Lloyd. xxx, 403—spectrum, Meyer. xxvii, 479, 482—TESTS: compar. of iodic ac., sulphmolybd. ac., ferric chlor., Brown. xxvii, 485; format. of sulphomorphid, Hadler. xxii, 265; sulph. and nitr. ac., Husemann. xxiii, 391; sulph. ac., ferrous sulph., ammon., Jorissen. xxx, 402; perchlor. iron and red prussiate pot., Kalbrunner. xxii, 262; sulph. ac. and ferric chlor., Lindo. xxvi, 560; ammon.-sulph. copper, Lindo. xxvii, 484; Husemann's test, Prescott and Wyman. xxvi, 562; sulph. ac. and sugar, Schneider. xxii, 264; glac. acet. ac. and red lead, Selmi. xxiv, 344; sulph. ac. and various reagents, Selmi. xxvii, 484; sulph. ac. and perchlorate pot., Siebold. xxii, 263; Southey's sulphomolybd. ac. test fallacious, Wellcome and Prescott. xxiv, 180; chlorinated soda or lime, Wellcome. xxiii, 391; sugar and sulph. ac., Weppen. xxiii, 393—detect. in QUIN. SULPH. (thalleioquin react.), Flückiger. xxi, 499; (ferricy. pot., ferric chlor.), Hager. xxi, 499; (dil. nitr. ac.), Hesse. xxiii, 398; (iod. ac. and chlorof.), Jassoy. xxii, 264.
- and ATROPIA, respective balancing quantities, Didama. xxvii, 93; hypodermic sol., Didama. xxvii, 93.
- ACETATE, best for hypodermic inject., Martindale. xix, 225; Powers. xxvii, 93—solub. in water and alc., Lloyd. xxx, 403—solut. decomposes, Maisch. xix, 224—is not stable, Merck. xxv, 301.
- cpd. with BILIARY ACID, Arbre. xxi, 372.
- HYDRIODATE, Baur. xxiii, 393; Schmidt. xxv, 300; xxvi, 563; Pelletier, Winkler. xxvi, 563.
- HYDROBROMATE, in hypodermic inject., Landrieux. xxx, 404—prep., Bullock. xxiii, 705, 6; McDonald. xxi, 370; Schmidt. xxv, 300; xxvi, 563—therapeut. value. xxviii, 324.
- HYDROCYANATE, Maisch. xix, 225.
- IODO-MERCURATE, Jackson and Payne. xxx, 399, 400.
- MECONATE, for hypodermic inject., Smith. xxii, 265.
- MURIATE, act. of sulph. ac. and sugar, Hamlin, Jr. xxix, 325—diff. in bulk depends on size of crystals, Hager. xxviii, 324—hypodermic solut., Powers. xxvii, 93—prop., Tausch. xxviii, 323—solub. in alc., Candidus. xxx, 565; in glyc., Farley. xxviii, 285; in water and alc., Lloyd. xxx, 403—real opium strength of Ph. Brit., Shuttleworth. xxiv, 181.
- NITROPRUSSIDE, Davy. xxix, 325.
- SESQUIODIDE, Bauer. xxiii, 394.
- SULPHATE, adult. (quin. sulph.). xix, 345—fluid volume, Candidus. xxvii, 79—hypodermic solut., Powers. xxvii, 93—solub. in alc., Candidus. xxx, 565; in water and alc., Lloyd. xxx, 430; in water, Power. xxx, 403—suppositories, analysis, Sørensen. xxiii, 520.
- TARTRATE, hypodermic use, Stuart. xxviii, 324.
- TETRAIODIDE, Bauer. xxiii, 394.
- TUNGSTOBORATE, Klein. xxx, 302.

Morphiometry, see OPIUM, ASSAY and MORPHIA, ESTIMATION.

Morrison, mayor of Toronto, Canada, address of welcome. xxv, 516.

Mortar (pivot in centre), Buck. xxix, 34—to clean fr. asafoetida, Ackermann. xxii, 68—practice, Cummings. xxiii, 588.

Morus RUBRA, Kansas. xxix, 452.

Mosandrium, Smith. xxvii, 341—is probably impure terbia, Mariguac and Delafontaine. xxvii, 341.

Moschatina fr. *Achillea moschata*, *Planta-Reichenau*. xix, 285; xxix, 159.

Mosquito yuyo, Arg. Republ. xxiv, 765.

Moss, CHINESE=Agar-agar. xxix, 118.

— CORSICAN, cont. rarely *Fucus helmintochorton*. Brignon. xxx, 141.

— ICELAND, see CETRARIA; ICELAND MOSS.

— IRISH, see IRISH MOSS.

Moths, to catch and poison, Saunders. xxi, 629.

—, INDIAN MEAL-, (*Tinea zeæ*), as injurious to drugs, Saunders. xxi, 625.

—, MEAL-, (*Pyrallis farinalis*), as injurious to drugs, Saunders. xxi, 625.

"Mother-of-pearl," Young's, analysis, Risser. xxiv, 420.

Motion, see also RESOLUTION.

— to take chairman of committee on ADULT. annually fr. a diff. city. xix, 52.

— to defer reading of ANSWERS to QUERIES and refer for publ. (Jefferson). xix, 82.

— not to receive APPLICATION having only one endorsement, (Squibb.) xx, 26.

— on BANQUETS (Remington). xxx, 650.

— to thank H. B. BRADY for photographs of English pharmacists. (Squibb.) xx, 57.

— to send fraternal greetings to BRITISH PHAR. CONFERENCE (Sargent). xviii, 17.

— to appoint committee to report on CENTENNIAL EXHIBITION (Bullock). xxiv, 570.

— demanding return of CERTIFICATES by those who are no longer members. (Shinn). xxiv, 600.

— Chapt. VI., Art. VI. to read: all COLLEGES OF PHARM. CONTROLLED BY PHARMACISTS. . . (Judge) xx, 71.

— to continue COMMITTEE for 1876. xx, 74.

— to recommit report of committee on CONSTITUT. and BY-LAWS (Squibb). xviii, 54.

— adopting CONSTITUT. and BY-LAWS as amended. xviii, 96.

— to strike out in ART. I., SECT. 5 of CONSTITUT. "as much as possible." (Colcord). xviii, 95.

— to adopt recommend. of business committee about COUNCIL (Brown). xx, 37.

— to indefinitely postpone "COUNCIL." (Moore). xx, 53.

— to authorize DELEGATES fr. two colleges to nominate, although credentials were not received. (Squibb.) xx, 35.

— to defer act. on report of committee on admission of DELEGATES. xx, 110.

— of thanks to DEPARTMENT of the INTERIOR for donation of books. xxi, 53.

— to return G. S. DICKEY's paper to put it in proper shape (Squibb). xviii, 108.

— chairman committee on DRUG MARKET to bring in bill of expenses (Wright). xxii, 550.

— about changing ANNUAL DUES fr. three to five dollars. xviii, 44.

— to call EBERT'S DONATION "Ebert's fund," and the prize, "Ebert's prize." (Leis). xxi, 70.

— on ELIGIBILITY of PROFESSORS of chem. and mat. med. to prof. of pharmacy (Bedford). xxiii, 758, 795.

— to adopt report on ELIXIRS. xxiii, 790.

— discretionary power to ENTERTAINMENT committee. xxx, 664.

— members to bear their own EXPENSES (Seabury). xxix, 504, 528.

— to appoint committee on JUL. FEHR. complaint (Lillard). xxiii, 843.

— to expel JUL. FEHR (Squibb). xxiv, 622, 3.

— committee on UNOFF. FORMULAS to be a one-man committee (Squibb). xviii, 63, 4.

— continue committee on UNOFF. FORMULAS (Squibb). xx, 73.

— accept report on FORMULAS, excepting elixirs. xxiii, 776.

— committee on admission of delegates fr. GEORGETOWN school of pharmacy, Washington, D. C. xx, 47.

— to omit discussion on receipt. of delegates fr. GEORGETOWN school of pharm. xx, 71.

— of thanks to D. HANBURY for his paper on export fr. Virginia 1610 (Bedford). xix, 79.

— to invite INTERNATIONAL PHARMAC. CONGRESS. xix, 74, 6.

— to add a member fr. Missouri to committee on LEGISLATION (Parrish). xix, 70.

— committee on LIEBIG'S MEMORIAL. xxii, 534.

- Motion**, to return money for **LIEBIG MEMORIAL** to contributors (Menninger). xxiv, 605.
- **LIFE MEMBERS** who decline to relinquish (1873) are declared to have done so (Squibb). xx, 60.
- increase of fund and **LIFE MEMBERSHIP** (Maisch). xxvi, 914.
- committee on **LIQUOR LICENSE** to be increased to five. xix, 99.
- in case the **LOCAL SECRETARY** is prevented fr. acting the execut. committee make necessary arrangements (Menninger). xx, 102.
- to prolong **MEETING** to one week. xxii, 543.
- **MEETING 1876** to take place in Philadelphia. xix, 76.
- **MEMBERS** in **ARREARS** not to be allowed to vote for president (Murray). xviii, 50.
- delegates from **University of MICHIGAN**. xix, 31, 2, 3, 4.
- resolut. of **N. JERSEY PHAR. ASSN.** (liquor license). xix, 69.
- **E. P. NICHOLS** as second candidate for president (McIntyre). xx, 45.
- to print letter of thanks of the **NORTH GERMAN AP. SOC.** in German and English. xix, 77.
- to send greeting to **NORTH GERMAN AP. SOC.** xix, 100.
- melting point of **PETROLEUM** (Remington). xxix, 507.
- inviting **PHARMACISTS** fr. **ALL COUNTRIES** (Ebert). xix, 74.
- publishing **LAWS** of **PHARMACY**. xviii, 57.
- discharge comtee. on **PHOTOGRAPH ALBUM**. xxiv, 608.
- about publishing **REPORT** on **PROGRESS** of **PHARMACY**. xx, 69.
- about dividing labor on **REPORT** on **PROGRESS** of **PHAR.** among 3 to 5 members. xx, 75.
- to remunerate **REPORTER** on **PROGRESS** of **PHARMACY** (Squibb). xxi, 61, 73, 95, 96.
- about **EARLIER PUBLICATION** of papers (Squibb). xxi, 81.
- appointing a committee on **RAILROAD TRANSPORT** (Bedford). xxvii, 806.
- **REPORTS** of **COMMITTEES** not received prior to adjournment be passed over till next year (Squibb). xx, 73.
- appoint comtee. on **INCREASE** of **REVENUE**. xxv, 539, 542.
- to refer suggestions in report of **PERMAN. SEC. RETARY** to committee on president's address. xx, 44.
- to increase salary of **PERMANENT SECRETARY** (Squibb), xxi, 95, 6.
- of thanks to **SIGNAL SERVICE** officer (Squibb). xx, 57.
- to appoint committee. on **SPECIMEN** (exhibit) at the first session. xx, 110.
- of thanks to **E. R. SQUIBB** for his paper on alcohol. xxi, 71—for his pharmacopœia revision work. xxv, 532.
- to pay expenses of **STANDING COMTERS.** up to twenty-five dollars each (Bedford). xxii, 550.
- to increase salary of **TREASURER** (Squibb). xxi, 95, 96.
- to permit **TREASURER** to destroy all old letters and bills after three years. xxvi, 906.
- to give representat. of **WEST. WHOLESALE DRUGGISTS** the courtesy of the floor (Remington). xxx, 597.
- Motoringni** = *Solanum indicum*, India. xxviii, 120.
- Moto**, for brewing saké, Japan. xxii, 404.
- Mouse ear** = *Antennaria plantaginifolia*, Kansas. xxix, 442.
- Moustopyta** = grape juice jelly, Greece. xxiv, 170.
- Mouth paste**, **ANTISEPTIC**, Maury. xxiv, 112.
- Mouthwash**. xxx, 132—Fairthorne. xxx, 85.
- Maandarusi** = African copal tree. xxiii, 229.
- Muchukunda** = flowers of *Pterospermum suberifolium*, India. xxvi, 165.
- Muchurru** = exudation fr. *Salmalia malabarica*, India. xxv, 233.
- Mucilage**, see also **PASTE**; **CEMENT**.
- **ACACIA** and alcohol, Bidwell. xxiii, 612—decolorized (sulph. alumina). xxx, 88—keep (glyc.), Rother. xxi, 134; (quinia). xxi, 166; (salicyl.)
- Mucilage. (Continued.)**
- ac.). Preston. xxiv, 83; (tolu), Archer. xxiii, 81—causes and prevention of thickening, Vorder; Madsen. xxx, 88—purified (sulph. ac.) Hirschberg. xxi, 174; Kirchner and Tollens. xxiv, 315—more adhesive (sulph. alumina). xxii, 77; xxiv, 83.
- **FLAXSEED**, purified, prop., Kirchner and Tollens. xxiv, 315.
- **IRISH MOSS**, Husted. xxx, 95.
- fr. residue fr. unct. MYRRH, Shuttleworth. xxi, 137.
- **QUINCE**, purified, prop., Kirchner and Tollens. xxiv, 315.
- **TRAGACANTH**, expeditious. xix, 149; xxi, 174.
- Mucilaginous BODIES** (3 groups), Girard. xxiii, 316.
- Muckee** = Mezquite gum. xxiii, 651.
- Mucor CIRCINELLOIDES** for purifying sugar. xxix, 309.
- **MUCEDO** cont. trehalose, Muntz. xxiii, 122.
- Mucuna CYLINDROSPERMA**, Africa, descript., Holmes. xxvii, 255.
- Mucura-ea-ha** = *Didelphis cancrivora*, Brazil. xxvi, 216.
- Mud-wasp**. xxvii, 178.
- Mudar BARK**, account. xxiv, 139—= *Calatropis gigantea* and *C. procera*, India. xxviii, 139.
- See also **CALATROPIS**.
- Mudarin**. xxiv, 139.
- Muder Khot** = *Aplotaxis auriculata*, Kashmir. xxvi, 225.
- Muenphue** = *Randia dumetorum*, India. xxiv, 725.
- Mugwort** = *Artemisia vulgaris*; —M. WESTERN—A. ludoviciana, Kansas. xxix, 442.
- Muh-hiang** = *Aplotaxis auriculata*, China. xxvi, 225.
- Muischond blaaren** (musk cat leaves), So. Africa. xxiv, 738.
- Muitle** = *Sericographis mohintli*, Mexico. xxiv, 773.
- Muizak-l-asli** = berries of a spec. of viscum, Persia. xxviii, 159.
- Mulberry BARK** is not much of a vermifuge, Bérenger. xxx, 251—LEAVES use by Indians. xxi, 619.
- Mulga GUM**, Queensland. xxiv, 741.
- Mulgedium ACUMINATUM**, Kansas. xxix, 442.
- Mu-lien** = *Coptis teeta*, China. xxiv, 158.
- Mulinum**, Chili. xxiv, 766.
- Mull-in flowers**, loss in drying. xxi, 202.
- , **MOTH-**, = *Verbascum blattaria*. xxix, 451.
- Mulli** = *Solanum indicum*, India. xxviii, 120.
- Mume** = *Amygdalus nana*, Japan. xxviii, 179.
- Mung-yu** = *Muraena pekrinensis*, China. xxii, 172.
- Munjeet** = *Rubia cordifolia* and *R. munjista*, India. xxiv, 717.
- Muña-muña**, Arg. Republ. xxiv, 763.
- Murabba** (= indigo in acid), India. xxiv, 715.
- Muradsingh kawun** = fruit of *Helicterus Isora*, India. xxvi, 165.
- Muraena PEKRINENSIS**, China. xxii, 172.
- Murdannia SCAPIFLORA**, India. xxiv, 724.
- Murex TRUNCULUS** and *M. BRANDARIS*, coloring matter, India. xxiv, 386.
- Muricia COCHINCHINENSIS**, China. xxiv, 757.
- Murium** (murium oxide of Berzelius=chlorine). xxviii, 218.
- Murja Devi** = *Ipomœa pes capræ*, India. xxv, 145.
- Murray, F. Marion**, uniformity in chemical terminology. xxvi, 792.
- discussions: xxvi, 882, 887, 888, 903, 908; xxx, 635.
- *T. C.* xviii, 95.
- Murraya EXOTICA**, India, descript., Dymock. xxv, 185—in Java. xxvii, 528.
- **KONINGH**, India, descript., Dymock. xxv, 185.
- Murrayin** fr. *Murraya exotica*, Java, Vrij. xxvii, 528.
- Murta** = *Myrtus agni*, Chili. xxiv, 765.
- Muratouri** = *Lawsonia alba*, India. xxvii, 238.
- Musa PEHII**, Tahiti, reaction of coloring matter, Niederstadt. xxiv, 125.
- Musaceæ**. xxiv, 125; xxvii, 145.
- Muscari COMOSUM**, Greece. xxix, 125.
- Muscarin** fr. *Amanita muscaria*, Kopp and Schmiedeberg. xviii, 273—fr. neurin, Diakonow. xxvi, 611.

- Mushrooms**, EDIBLE, Japan. xxv, 117, 8.
 — saccharine matter, Muntz. xxiii, 122.
- Musk**, adult. chiefly practiced at port of export, Rump. xxi, 268—(40 p. c. earthy matter). xxiii, 503—drug market. xxii, 637; xxvii, 574—odor disguised by quinine, Bargas; by fennel, Biermann. xxviii, 210—in mixtures, (hot water) Lailier. xix, 149; (sugar) Virlogeux. xxix, 85—yield of "grain," Cramer and Small. xxi, 269.
 — ALLIGATOR, prop. xxviii, 210—ANTILope DORCAS, excrements, Bertherand. xxvi, 332—ASSAM, prop., Rump. xxi, 268—CARARDINE, prop., Rump. xxi, 268—CHINA, account. xxiv, 751—KHOTEN. xxix, 238—MUSKRAT, Fairthorne. xxx, 254—THIBET, only where birch trees grow, Lydekker. xxix, 237—TONQUIN, prop., Rump. xxi, 268.
- Musli**=Curculigo uncifolia, India. xxix, 128.
- Musquit**=Mezquite gum. xxiii, 651.
- Mussaenda CRENATA**, Mauritius. xxiv, 741.
- Mussels**, poisonous character at certain seasons due to ptomaines, Schlagdenhauffen. xxx, 442.
- Mustard**, ground, adult. xxi, 481, 6; xxiii, 104; xxiv, 405; mineral adult. detect. by chloroform. xxviii, 278—as a deodorant, Schneider. xxv, 194—test for turmeric, (borax, mur. ac.) Maisch. xxi, 145.
 — BLACK, analysis, Piesse and Stansell. xxix, 204.
 — DURHAM, origin of name. xxii, 133.
 — HEDGE-, =Sisymbrium officinale, Kansas. xxix, 444.
 — SAREPTA, account, Haurowitz. xxiii, 204.
 — TABLE, should cont. 20 p. c. white mustard, Greenish. xxii, 133.
 — TREACLE-, =Erysimum cheiranthoides, Kansas. xxix, 443.
 — WHITE, analysis, Piesse and Stansell. xxix, 204.
- Muttipal**=Ailanthus malabaricus, India. xxiv, 718.
- Mycena GALERICULATA** cont. oxalic ac., Hamlet and Plowright. xxvi, 178.
- Mycoraphin and Mycosterin**, fr. Agaricus fasciculatus, Harsten. xxiii, 123.
- Mydriatic ALKALOIDS**, origin and relations, Merck. xxx, 421.
- Mylabris CICHORII**. xx, 247, 252, 253; xxiv, 506, 507—yield of cantharidin, Fahnestock. xxvii, 287.
 — FOUR-SPOTTED—M. melanura, Spain; Russia. xx, 252;—M. MELANURA, Spain; Russia. xx, 252;—M. PHALERATA, So. Africa; China. xx, 251;—M. QUADRIPUNCTATA, Spain; Russia. xx, 252;—M. QUATUORDECIM-PUSTULATA, yield of cantharidin, Russia. xx, 257;—M. SIDÆ, So. Africa; China. xx, 251; yield of cantharidin. xxii, 169;—M. TENEBROSA in hydrophobia, Arabia, Reiche. xxvii, 286.
- Myopsin**, fr. pancreas, prep., prop., Defresne. xxvii, 545.
- Myoschylos OBLONGA**, Chili. xxiv, 766.
- Myosin** fr. seed of Lupinus varius, Vines. xxviii, 366.
- Myrcia ACRIS**, yield of oil, Markoe. xxv, 436—account. xxx, 110, see also BAY RUM.
- Myrica CALIFORNICA**. xix, 306.
 — CORDIFOLIA, Cape of Good Hope. xxiv, 738.
 — JALAPENSIS, Mexico. xxiv, 769.
 — SAPIDA, India, descript., Dymock. xxviii, 197.
- Myricaceæ**. xxii, 162; xxviii, 197; of California. xix, 306.
- Myricin** (eclectic) solubility, Parker. xxx, 128.
- Myriogyne CUNNINGHAMI** and M. MINUTA, Australia, analysis, Müller. xxvii, 282.
- Myriophyllum VERTICILLATUM**, Chili. xxiv, 766.
- Myristica MOSCHATA**, Jamaica. xxiv, 735—M. OFFICINALIS;—M. PUNCTATA;—M. SEBIFERA;—M. TOMENTOSA, descript. of fruit, Müller. xxix, 135.
- Myristicaceæ**. xxix, 134; xxx, 156.
- Myristicin**, prop., Flückiger. xxii, 217—is really myristic acid, Flückiger. xxiii, 331.
- Myristicol**, prop., Wright. xxii, 216.
- Myrmecocystus MEXICANUS**, account, Saunders. xxi, 648.
- Myrobalans (CHEBULA)**, India. xxvii, 232—(EMB-LICA) yields 45 p. c. tannin, Henning. xviii, 285.
- Myrobalanaceæ**. xxi, 245.
- Myrobroma FRAGRANS** (vanilla), Mexico. xxix, 130.
- Myrocarpus FASTIGIATUS**, So. America. xxvii, 242.
- Myrosin**, fermentat. power destroyed by borax, Dumas. xxi, 400.
- Myroxylon fr. Myroxylon peruiferum**, Peckolt. xxix, 216.
- Myroxylon PEREIRÆ**, Central America. xxii, 149.
 — PERUIFERUM, account, etc., Peckolt. xxvii, 241; xxix, 215—analysis and prop. of bark. xxvii, 244—leaves. xxvii, 244—oil. xxix, 215—pods. xxvii, 244—wood. xxix, 215. See also BALSAM PERU.
 — TOLUIFERUM should be called Toluiferum balsamum, Baillon. xxii, 149.
- Myrospermum ERYTHROXYLUM**, So. America. xxvii, 241.
 — PERUIFERUM. xxvii, 241. See also BALSAM PERU.
- Myrrh**, adult. of powd. xxx, 576; mineral adult. detect. by chlorof. xxviii, 278—behavior to reagents, Hirschsohn. xxvi, 453—9—collection, impurities, composition, Parker. xxviii, 189; xxix, 231; Dymock. xxiv, 196—amount of gum. xxviii, 190—in mixture, Blackwell. xxvii, 70—source, Trimen. xxvii, 260.
 — PERSIAN, descript., Dymock. xxv, 219.
- Myrrhis POLIIS TRILOBATIS**, Gronovius (= Osmorrhiza longistylus). xxx, 209.
- Myrsine d'URVILLEI**, New Zealand. xxiv, 737.
- Myrsineæ**. xxv, 153.
- Myrtaceæ**. xviii, 287; xix, 275; xxi, 245; xxii, 145; xxiii, 206; xxiv, 187; xxv, 203; xxvi, 279; xxvii, 233; xxviii, 176; xxix, 207; of Mexico. xxiv, 775.
- Myrtle**, therapeut. value, Delieux. xxiv, 187—berries, use in Greece, Landerer. xxix, 207.
- Myrtus AGNI**, Chili. xxiv, 765;—M. ARRAYAN, Mexico. xxiv, 775;—M. CHEKAN, Chili, descript., Holmes. xxvii, 235, 6;—M. COMMUNIS, use in Malta. xxvi, 167;—M. LUMA, Chili. xxiv, 765.
- Mytoneron** = orange flower water, Greece. xxvii, 64.
- My-to-seng** = chromate lead, China. xxii, 32.
- My-yu** = Scizæna lucida, China. xxii, 172.

N.

- Naga-musadi** = Strychnos colubrina, India. xxviii, 136.
- Nagchumpa**=Mesua ferrea, India. xxv, 183.
- Nagdown**=Artemisia indica, India. xxviii, 144; = Crinum asiaticum, India. xxix, 127.
- Nagkaria**=Methonia superba, India. xxvi, 158.
- Nagkesur**=flowers of Mesua ferrea, India. xxv, 183.
- Nai yalu**=Raphidophora vitiensis, Fiji. xxx, 146.
- Najadaceæ**, Kansas. xxix, 448.
- Najas FLEXILIS**, Kansas. xxix, 448.
- Nakk-chiknee**=Artemisia sternutatoria, India. xxviii, 144.
- Nakpatar**=Ipomæa turpethum, India. xxviii, 130.
- Napellin**, prop., Flückiger. xix, 229; Wright. xxvi, 596—(of Hübschmann) is a decomposit. product, Wright and Luff. xxvi, 598.
- Naphtha**, act. of bromine, Allen. xxx, 314.
 —, SHALE-, prop., Allen. xxix, 283, 4.
- Naphthalin**, on a large scale, Vohl. xviii, 250—purificat., Lunge. xxx, 315; Stavely. xxx, 316— as solvent, Vohl. xviii, 250; soluble in water, Lupton. xxiv, 270.
 —, ARTIFICIAL (fr. oil turpentine), Schulz. xxv, 269.
 — YELLOW, coloring power, Küpfer. xxiv, 382.
 — ROSA, coloring power, Küpfer. xxiv, 383.
- Naphthol** "1,3," in skin diseases, Kaposi. xxx, 317, 473.
- Naphthylamin**, distinct. tests fr. aniline, Lupton. xxiv, 369—prep. fr. nitro-naphthalin, Ballo. xix, 223.
- Narak-karandei**=Blumea aurita, India. xxvii, 179.

- Narceina**, behav. to reagents, Beckett and Wright. xxiv, 346; act. of sulph. ac., Schulze. xxiii, 396—constitut., Wright and Beckett. xxvi, 564—estimat. (bismuth and pot. iod.) Thresh. xxviii, 320—history. xxi, 374—colored blue by iodine, Stein. xviii, 262—isolated by carbolic ac., Salomon. xxi, 340, 377—microsublimating point, Blyth. xxvii, 483—physiolog. act., Ott. xxvi, 277—prep., Phar. Soc. Paris. xxvi, 564—**TESTS**: with chlorine and ammonia, Vogel. xxiii, 396; sulph. ac. and ferric chlor., How. xxvi, 560; Husemann's morphia test, Prescott and Wyman. xxvi, 563; zinc chlor., Jorissen. xxix, 267; (iod. zinc, pot.) Stein. xix, 226.
- MURIATE**, physiolog. act., Heintz. xxv, 302—prep., Wright. xxii, 266.
- Narcissus cultivat.**, France. xxvii, 383.
- PSEUDO NARCISSUS**, analysis, Gerrard. xxvi, 191.
- Narcotin**, act. of arseniate sod., Tattersall. xxviii, 324, 5; act. of sulph. ac. and ammon., Armstrong. xix, 226; of sulph. ac. and sugar, Hamlin, Jr. xxix, 325; of water at elevat. temp., Matthiessen and Foster. xxiv, 344—constitut., Wright and Beckett. xxvi, 564—history. xxi, 373—microsublimating point, Blyth. xxvii, 483—physiolog. act., Ott. xxvi, 277—solubil. in alcohol, Lefean. xxix, 324—**TESTS**: sulph. ac., ferric chlor., How. xxvi, 560—Husemann's morphia test, Prescott and Wyman. xxvi, 562—yields vanillin, Wright and Beckett. xxvi, 564.
- Nardeen**=*Nardostachys jatamansi*, India. xxvii, 180.
- Nardostachys JATAMANSI**, India. xxiv, 724; descript., Dymock. xxvii, 180. See also **JATAMANSI**.
- Nardus CELTICA**, Austria. xxii, 166—**N. STRICTA**, ergot, Wilson. xxiv, 120.
- Naregamia ALATA**, India, descript., Dymock. xxvi, 158.
- Nargamotha**=tuber of *Cyperus pertenuis*, India. xxix, 120.
- Naril**=kernel of *Lodicea Seychellarum*, India. xxvi, 162.
- Naringin** (=hesperidin of Vrij) fr. *Citrus decumana*, Hoffmann. xxvii, 526.
- Naruvilli**=fruit of *Cordia myxa* and *C. latifolia*, India. xxviii, 129.
- Nasha**=Hashish, Central Asia. xxv, 228.
- Nashville**, as a place of meeting. xx, 99.
- Nasturtium CURVISILICUA**, California. xix, 290.
- OFFICINALIS**, analysis, Church. xxv, 194—constitut. of oil, Hoffmann. xxii, 222—Kansas. xxix, 443.
- Nataloin**, Tilden. xxiv, 378—act. of bichromate mixt., Tilden. xxvi, 614—distinct. test fr. barbaloïn, Histed. xxiv, 379; and fr. socaloin, Tilden. xxi, 389—prep. and prop., Mitchell. xxiv, 379—therapeut. value, Dobson. xxvi, 616.
- Nat-ka-bachnag**=*Gloriosa superba*, India. xxix, 126.
- Nattan-takarai**=*Cassia occidentalis*, India. xxvi, 166.
- Natti**, a spec. of celery, India. xxvii, 192.
- Nayaphatki**=*Cardiospermum halicacalum*, India. xxvi, 166.
- Neaará**=*Thylobates bicolor*, So. America. xxix, 238.
- Nebraska**, pharmacy law. xxi, 506.
- Necrology of scientists**. xviii, 294; xix, 319; xxi, 406; xxii, 291.
- See also **OBITUARY NOTICES**.
- Nectandria**, prop., MacLagan and Gamgee. xviii, 266.
- Nectar** (of flowers), amount of sugar, Wilson. xxvii, 442.
- Neem bark**=*Azadirachta indica*; which see and also **NIM BARK**.
- Neergaard, W.** xxiv, 621.
- Neesan**=*Zingiber cassumunar*, India. xxviii, 114.
- Neesun**=*Zingiber macrostachyum*, India. xxv, 128.
- Negrilla**, Arg. Republ. xxiv, 763.
- Negundo ACEROIDES**, Kansas. xxix, 451.
- Neil Kalmee**=*Pharbitis nil*, India. xxiv, 726.
- Neko bana**=*Anemone cernua*, Japan. xxviii, 163.
- Nelumbium LUTEUM**, Kansas. xxix, 448.
- SPECIOSUM**, India. xxiv, 721; descript., Dymock. xxvi, 164—Japan, descript., Holmes. xxviii, 115.
- Neotoma**, yield a hyraceum-like substance, New Mexico. xxviii, 211.
- Nepenthes GRACILIS**;—**N. PHYLLAMPHORA**, contain pepton-forming ferment, Gorup and Will. xxv, 30, 329.
- Nepeta CATARIA**;—**N. GLECHOMA**, Kansas. xxix, 446.
- Nephelin** for making chloride sodium crystals, Rose. xxii, 188.
- Nephrodium FELIX MAS**;—**N. RIGIDUM**, California. xix, 307.
- Neptunium**, Herrmann. xxv, 31, 268.
- Neriodorein** and **Neriodorin**, Greenish. xxix, 153.
- Nerium ODORUM**, India, constituents of root, Greenish. xxix, 153.
- OLEANDER**, petals, yield of glucose, Boussingault. xxvi, 514—in epilepsy, Greece. xxiv, 136.
- Nestle's KINDERMEHL**, analysis, Müller. xxiv, 110.
- Netherlands**, drugs, Centen. exhibit. xxiv, 742—pharmacopœia. xix, 316.
- Nettle, CANADA**,= *Laportea canadensis*;—**N. DWARF**,= *Urtica urens*;—**N. HORSE**,= *Solanum carolinense*, Kansas. xxix, 451, 2.
- ROMAN**,= *Urtica pilulifera*, uses in Greece. Landerer. xxx, 245.
- Neurin**, identical with amanitin, Diakonow. xxvi, 611—converted into muscarin, Diakonow. xxvi, 611—fr. yolk of eggs, Diakonow. xxvi, 610—synonyms. xxvi, 611—synthesis (fr. oxychloride of ethylen), Wurtz. xix, 235.
- Newark PHARM. ASSOCIATION**, formulary. xix, 162.
- Newerang**=*Euphorbia nervifolia*, India. xxviii, 192.
- New Hampshire**, pharmacy law. xix, 356; xxiii, 542, 5.
- New Jersey**, adulteration law. xxix, 378, 394—pharmacy law. xix, 314, 356; xxii, 330; xxv, 381, 8; xxvii, 659, 661; xxx, 478—pharmaceut. legislation, Mercein. xxiii, 551—pharmaceut. association (about liquor license). xix, 64.
- New York**, adult. law. xxix, 378, 394—pharmacy law. xix, 314, 355, 373; xx, 147; xxix, 375.
- New Zealand**, drugs, Centen. exhibit. xxiv, 737; xxv, 365, 6—fungi. xxiv, 738—tanning material. xxiv, 737.
- N'gai camphor**, see **CAMPHOR**, **N'GAI**.
- N'go-hieu**, China. xxii, 33.
- kiao**, China. xxii, 33.
- Nichols, E. P.**, fld. extr. vanilla. xxi, 597—relation of physician to pharmacist. xxiii, 557.
- discussion: xx, 87; xxi, 82, 84; xxv, 528.
- Nickel**. xviii, 236; xix, 216; xxiii, 292; xxiv, 247; xxvi, 397; xxvii, 351; xxix, 264; xxx, 296.
- act. upon nitric ac., Acworth and Armstrong. xxvi, 343—carburation, makes it neither elastic nor gives it temper, Boussingault. xxvi, 397—deposits, New Caledonia. xxvi, 397; U. S. xxiii, 292—absorbs hydrogen, Raoult. xviii, 217—in magnesit. xviii, 233—malleable (phosphorus), Garnier. xxix, 264.
- PLATING**, Adams' process. xxi, 126—Becquerel. xix, 216—Boden. xxiv, 248—Kalmar. xxix, 265—Stolba. xxi, 126; xxvii, 351—prevention of scaling, Brownell. xxiv, 248.
- SALTS**, act. of trimethylamin, Vincent. xxv, 315—separat. fr. cobalt in analysis, Kilpius. xxiv, 218; Guyard; Phipson. xxvi, 398; fr. iron, Moore. xxx, 296; fr. zinc, Beilstein. xxvii, 351.
- ACETATE**, dissolves sulphate lead, Debbits. xxii, 200.
- AMIDOSULPHONATE**, Berglund. xxvii, 331.
- AMMONIO-CHLORIDE**, Loughlin. xxiv, 247.
- AMMONIO-SULPHATE**, Loughlin. xxiv, 247.
- ARSENIDE**, Deschamps. xxvii, 367.
- CHLORIDE**, act. of ozone, Mailfert. xxx, 259—soluble in anhydrous ether, Skey. xxvi, 477.
- NITRATE**, act. of ozone, Mailfert. xxx, 259.
- OXIDE**, temp. of reduct. by hydrogen, Müller. xix, 138.

- Nickel SULPHATE**, pure, fr. commercial nickel, Terreil. xxiii, 292; xxiv, 247—act. of ozone, Mailfert. xxx, 259.
- **SULPHOCYANIDE**, soluble in anhydrous ether, Skey. xxvi, 477.
- **TUNGSTOBORATE**, Klein. xxx, 301.
- Nicot**, L. E. on nominating. xxviii, 556.
- discussions: xxviii, 556, 558.
- Nicotiana ATTENUATA**;—N. BIGELOWII, Arizona. xxvii, 158;—N. GLAUCA, Mexico xxiv, 772;—N. QUADRIVALVIS, California. xix, 305;—N. TRIGONOPHYLLA, Arizona. xxvii, 158.
- Nicotina**, compd. with biliary acids, Arbore. xxi, 372—in *Cannabis indica*, Preobrachensky. xxvii, 267—constitution (probably fr. aldehyd of pyrotartaric ac.), Weidl. xxi, 384—by dialysis, Guyot. xxvi, 608—estimat., Kissling. xxx, 167; Skalweit. xxx, 165, 6—in hypodermic solut., Powers. xxvii, 94—prep., Kirchmann. xxv, 314; Laiblin. xxviii, 342; Wenderoth. xxx, 167—yields vanillin, Wright and Beckett. xxvi, 619—yield fr. diff. varieties of smoking and chewing tobacco, Pease. xxix, 139.
- **ALUM**, Kirchmann. xxv, 314.
- **BROMATED HYDROBROMIDE**, Laiblin. xxviii, 343.
- **NITROPRUSSIDE**, Davy. xxix, 325.
- **SULPHO - GLYCERO - CARBOLATE** (!!), Wilson. xxviii, 91.
- Nieljeri** (app. for cadaver poison), Australia. xxvii, 522.
- Nigella ARVENSIS**. xxx, 212.
- **DAMASCENA**, distinct. of seed fr. that of *N. sativa*, Greenish. xxx, 211—possess odor of strawberries when rubbed. xxx, 212.
- **FOENICULUM**. xxx, 212.
- **SATIVA**, analysis, Greenish. xxviii, 161, 3—cont. melanthin. xxviii, 161, 3: xxx, 212.
- Nigellin** (of Reinsch) not a definite body, Greenish. xxviii, 162.
- Niger seed** fr. *Guizotia oleifera*, India. xxiv, 722.
- Nightblooming cereus** = *Cactus grandiflora*, India, therapeut. uses. xxi, 620.
- Nightshade**, enchanter's = *Circæa lutetiana*, Kansas. xxix, 448.
- Niln fat** of Yucatan, account, Schott. xix, 312.
- Nilane**, var. of olive tree, Italy, xxi, 217.
- Nilap-panaik-kizhangu** = *Curculigo uncifolia*, India. xxix, 128.
- Nim tree** = *Azadirachta indica*. xxii, 155—analysis, Jacobs. xxviii, 170.
- Ning** = kernel, (Japanese.) xxviii, 99.
- Nio** = *Baccharis cordifolia*, Arg. Republ. xxx, 138.
- Niobium**, combines with carbon and nitrogen, Joly. xxiv, 235.
- Niourine**, Stearns, analysis, Risser. xxiv, 420.
- Niphotobus CALAGUALA**, Chili. xxiv, 766.
- Nipple** (GUM-) applied in a variety of ways, Eiroth. xxix, 53.
- Niquin** = *Osmorrhiza berteru*, Chili. xxiv, 765.
- Nir-brami** = *Herpestes monniera*, India. xxviii, 119.
- Nirumel-neruppu** = *Ammania vesicatoria*, India, xxvii, 237.
- Nishotar** = *Ipomæa turpethum*, India. xxviii, 130.
- Nisot** = *Ipomæa turpethum*, India. xxviii, 130.
- Nitrates** in potable waters, detection, Bolas. xxii, 175 (see also **NITRITES**)—reduced by fermentation and putrefaction, Schloesing. xix, 180.
- Nitre**, see **SALTPETRE** and **POTASSIUM, NITRATE**.
- Nitric OXIDE**, fr. sulphoc. pot. and cobaltous nit., Johnstone. xxx, 262.
- Nitrites**, detect. in potable waters, Ekins. xxx, 263 (see also **NITRATES**)—prep., Etard. xxvi, 342.
- Nitro-alizarin**, prep., Caro. xxvii, 532.
- Nitro-atropine**, Vitali. xxix, 336.
- Nitro-benzol**, detect., Brunner. xxx, 265; Debrunner. xxvi, 432; Jacquemin. xxiv, 268, 9—opalescent alc. test, Hager. xxx, 319.
- Nitro-colophthalin**, Curie. xxiii, 321.
- Nitro-daturia**, Vitalia. xxix, 336.
- Nitro-ethane**, Meyer. xxvi, 488.
- Nitrogen**. xviii, 218; xix, 179; xxi, 273; xxii, 175; xxiii, 240; xxiv, 208; xxvi, 341; xxvii, 295; xxviii, 215; xxix, 242; xxx, 262.
- allotropic form (analogous to ozone) Johnson. xxx, 262—detect. in alkaloids, Lassaigne. xxi, 655—liquefied, Cailliet. xxvi, 337, 9—**PREPARATION**: fr. the air, Berthelot. xix, 179; Harcourt and Lupton. xxiv, 208; fr. bichrom. ammonia, Levy. xix, 179—**PURE**: fr. ammonia nitrate, Gatehouse. xxviii, 215; fr. nitrates sod., ammon., bichrom. pot., Gibbs. xxvi, 341—fr. nitrite pot., chlor. ammon., Knapp. xix, 179.
- **CHLORIDE**, explodes in ozone, Jouglot. xix, 176—prep., Salzer. xxvii, 305.
- **IODIDE**, explodes in ozone, Jouglot. xix, 176—prop., Champion and Pellet. xxiv, 208.
- **OXIDES**, act. of sulphuric acid, Winckler. xviii, 219.
- **PEROXIDE**, compd. with phosph. magnesium, Luck. xxiv, 208.
- **PROTOXIDE**, see **NITROUS OXIDE**.
- Nitroglycerin**, boiling point, Kern. xxiii, 355—explodes in ozone, Jouglot. xix, 176—for headache. xxx, 473—prep. in small quantities, Boettger. xxv, 280—manufacture, Mobray. xviii, 252—prep. (sulphoglyceric and sulphcnitr. acids), Boutigny and Foucher. xxviii, 286; xxx, 359—pharmaceut. prep., Martindale. xxviii, 286—volatile at ordinary temp., Hess. xxv, 279.
- Nitro-mannitan**, Vignon. xxv, 290.
- Nitro-methane** as anæsthetic, Meyer. xxvi, 488.
- Nitro-pentane**, is poisonous, Meyer. xxvi, 488—format., Greene. xxvii, 413.
- Nitroprussides**, act. of alkaline sulphides, Bong. xxvi, 372.
- Nitrosyl-sulphate**, as disinfectant, Pabst and others. xxix, 244.
- Nitro-toluene**, prop., Rosenstiehl. xxii, 211.
- Nitrous oxide**, administration, Coleman. xviii, 218—as effervescing drink, Benger. xviii, 218—apparatus, Porter. xviii, 204—prep., McNefee. xviii, 218—solid, Wills. xxi, 273.
- Niwa toka** = *Sambucus nigra*, Japan. xxviii, 158.
- Nomenclature, CHEMICAL**, Murray. xxvi, 792, 903.—**PHARMACOPŒIAL**, Oldberg. xxviii, 383; discussion. xxviii, 545.
- Nomination of OFFICERS**, etc., not present at the meeting, ill-advised. xxi, 49—discussion. xxviii, 554.
- Nopalillo** = *Opuntia nopalillo*, Mexico. xxiv, 775.
- Nornarcotina**, history. xxi, 373.
- North Carolina**, pharmacy law. xxix, 376, 387.
- North German Apothecaries' Soc.**, address from Am. Ph. Assn. xviii, 115, 305—letter of thanks. xix, 77—cablegram from Am. Ph. Assn. xix, 100.
- Norway**, pharm. prep., Centen. exhibit. xxiv, 809.
- "Norwegian kitchen"**, Meyn. xxix, 51.
- Norwegium**, Dahl. xxviii, 258.
- Nottonia GRANDIFLORA**, uses in India. xxii, 119; xxiv, 141.
- Nova Scotia**, pharmacy law. xxv, 382, 390—pharm. soc. delegates. xxviii, 513.
- N'pendo** = *Chrysobalanus icaco*, Africa. xxix, 116.
- Nucit**, sugar fr. walnut leaves, Tanret and Villiers. xxvi, 530.
- Nucitannin** in walnut rind, Phipson. xix, 293.
- Nungu** = *Bassia oleifera*, Africa. xxix, 115.
- Nuphar ADVENA**, Kansas. xxix, 448.
- **JAPONICA**, Japan, descript., Holmes. xxviii, 115.
- Nurembergica HIPPOMANICA**, Arg. Republ. xxx, 138.
- Nutgalls**, see **GALLS**.
- Nutmeg**, act. of sulph. ac. and alc., Doliber. xix, 444—**VARIETIES**, Möller. xxix, 134.
- **JAMAICA**. xxiv, 735.
- **WILD**, = *Torreya Californica*. xxvii, 602.
- Nux vomica**, mineral adult. of powd. detect. by chlorof. xxviii, 278—detect. in beer, Wittstein. xxiii, 340; Dragendorff. xxx, 339—in fevers and snake bites in tropical countries. xxix, 335—constituent of fixed oil, Meyer. xxiv, 139—oil extr. by coaltar-benzol cont. neither strychnor bruc., but if extr. by gasoline, Greenish, Bullock, Wolff. xxx, 180.
- Nyctanthes ARBOR TRISTIS**, India. xxiv, 718—descript., Dymock. xxviii, 126.

Nymphaea LUTEA;—**N. NELUMBO**, Japan. xxviii, 115.
 — **ODORATA**, Kansas. xxix, 448.
Nymphaeaceae. xxviii, 115—of California. xix, 298; Kansas. xxix, 448.
Nyssa AQUATICA;—**N. BIFLORA**, Southern U. S. xxvii, 146.

O.

"Oak red." xxx, 396.
Oak BARK, estimat. of tannin. See **TANNIN**, estimation.
 — **LEAVES** cont. quercu-tannic and elagic acid, but no gallo-tannic acid, Oser. xxiv, 338.
 "Oak tannin" prop., Johansen. xxvi, 555.
Oak, BLACK,= **Quercus tinctoria**, Kansas. xxix, 444.
 —, **BURR**,= **Quercus lobata**, California. xxvii, 602; —= **Quercus macrocarpa**, Kansas. xxix, 444.
 —, **CHESTNUT**,= **Quercus densiflora**, California. xxvii, 602; —= **Quercus prinus**, Kansas. xxix, 444.
 —, **IRON**,= **Quercus obtusiloba**, Kansas. xxix, 444.
 —, **JERUSALEM**,= **Chenopodium botrys**, Kansas. xxix, 441.
 —, **LIVE**,= **Quercus agrifolia**, California. xxvii, 602.
 —, **PIN**,= **Quercus palustris**; — **O.**, **SCARLET**,= **Qu. coccinea**; — **O.**, **SPANISH**,= **Qu. falcata**; — **O.**, **WATER**,= **Qu. aquatica**, Kansas. xxix, 444.
 —, **WHITE**,= **Quercus Hindsii**, California. xxvii, 602.
Oat, analysis, Grandeau and Leclerc. xxx, 147—bran yields vanillin, Serullas. xxvii, 531.
 —, **WILD**,= **Avena sativa**, California. xxvii, 604.
Obanna= **Eulalia japonica**, Japan. xxviii, 104.
Obi, **RED**, Java. xxiv, 742.
Obituary notices. xviii, 22; xix, 38; xx, 30; xxi, 39; xxii, 468; xxiii, 763; xxiv, 584; xxv, 488; xxvi, 861; xxvii, 766; xxviii, 518; xxix, 495; xxx, 612.
Andrews, George W. xxvi, 861.
Aspinwall, James S. xxii, 469.
Atwood, Charles Henry. xxi, 492.
Backus, James W. xix, 38.
Badger, Charles W. xxv, 489.
Bailey, Montgomery J. xxiii, 767.
Bayliss, William E. P. xxi, 40.
Beam, Isaac R. xxviii, 519.
Bell, Alexander C. xxix, 498.
Bell, Gotthold Emanuel. xxvii, 769.
Benzinger, John Sylvester. xviii, 23.
Bertolett, William J. xxv, 492.
Bidwell, Marshall Spring. xxvi, 862.
Bingham, John Calvin. xix, 38.
Blauw, Hippolytus A. xix, 38.
Boullay, Pierre Francois Guillaume. xviii, 24.
Bowman, Henry K. xxii, 469.
Boyden, Ashel. xxvi, 862.
Bright, James Evesson. xx, 30.
Bringham, Ferris. xix, 38, 42; xxvi, 19.
Brown, William. xxiii, 765.
Casselmann, C. L. Arthur. xxi, 40.
Callin, Theron. xxix, 500.
Chapman, William B. xxiii, 763.
Cherot, Leonce. xxvii, 768.
Chevallier, J. B. Alphonse. xxviii, 521.
Coddington, Isaac. xxiii, 764.
Coppuck, Peter V. xviii, 23.
Crawley, Francis X. xxx, 614.
Daggett, Jr., Alfred. xxvi, 864.
Dalrymple, Charles H. xxx, 613.
Davies, Robert J. xx, 31.
D'Evers, Henry G. xviii, 23.
Dover, Thomas. xxix, 500.
Dunk, Alfred A. xxviii, 518.
Durand, Elias. xxi, 40.
Ellis, Charles. xxii, 469.
Erben, John S. xxix, 499.
Everson, John C. xx, 30.
Eyster, Christian Edward. xxv, 491.
Faber, John. xxx, 614.
Foley, J. T. xxvii, 768.
Folger, William S. xxvi, 864.
Fowle, Henry D. xxx, 614.

Obituary notices. (Continued.)

Frohwein, Max. xxv, 493.
Frost, John J. xxviii, 519.
Fulton, John Culpepper P. xxii, 468.
Gabaudan, Arthur W. xviii, 23.
Gaither, Francis Singleton. xxiv, 587.
Geiger, Conrad J. xxiv, 586.
Gilman, Jr., Samuel K. xxviii, 519.
Gleeson, James A. xxviii, 520.
Gleeson, Michael H. xxviii, 518.
Green, Thomas T. xxix, 500.
Griswold, William H. xxvii, 768.
Haddox, James Bowling. xxviii, 520.
Hanbury, Daniel. xxiii, 767.
Harbaugh, Valentin xix, 39.
Hassard, Peter J. xxiv, 585.
Hegeman, William. xxiv, 584.
Henchman, Daniel. xxvi, 863.
Hendel, Samuel D. xix, 39.
Hensch, Hugo. xxiii, 763.
Heydenreich, Frederick Victor. xxvii, 768.
Hollis, Thomas. xxiii, 765.
Homann, James W. xxiv, 585.
Howard, George Montgomery. xxv, 493.
Hughes, Henry Arnold. xxv, 490.
Hunt, Henry W. xxvi, 862.
James, Thomas P. xxx, 612.
Jenkins, William Ellis. xviii, 23.
Johnson, Charles P. xxii, 468.
Keffer, Fred. A. xxii, 470.
Kettel, George P. xxx, 612.
Kidder, Darius B. xxii, 470.
Kiersted, Henry Taylor. xxx, 615, 661.
King, Alexander. xxv, 488.
Kolp Christopher H. xxvii, 767.
Krebs, Hugo. xxix, 496.
Krummeck, Jacob. xxvi, 864.
Lancaster, Thomas A. xxiii, 766.
Lane, Alfred S. xxix, 496.
Lewis, Thomas. xxviii, 519.
Lineweaver Kline C. xxi, 40.
Lingelbach, Ferdinand. xxvii, 769.
Ludwig, J. F. Hermann. xxi, 40.
Lyman, Benjamin. xxvii, 766.
Lyon, Charles H. xix, 39.
Macpherson, George B. xix, 39.
Mallinckrodt, Gustavus. xxv, 491.
Massot, Eugene L. xix, 39, 42, 3.
Mattern, Jonathan C. xxiv, 586.
Mayer, Ferdinand F. xviii, 22.
McBride, James. xxii, 468.
McConville, Michael S. xxii, 468.
McKay, George J. xxviii, 520.
Meade, Richard H. xxix, 495.
Melsar, A. P. xxiii, 763.
Menard, Alexander A. xxix, 496.
Merrick, John Mudge. xxvii, 766.
Metcalf, Tristram W. xxi, 40.
Milhan, John. xxiii, 764.
Mohr, Charles F. xxviii, 520.
Mott, Joseph. xxiii, 764.
Muller, William H. xviii, 23.
Mundy, William C. xxix, 499.
Nairn, Joseph W. xxiii, 766.
Neale, William J. C. xxix, 499.
Neergaard, John William. xxix, 497.
O'Gallagher, James. xxx, 615.
Osborne, William H. xxix, 500.
Parker, Herschel. xviii, 24.
Parrish, Edward. xxi, 40.
Patton, John F. xxix, 499.
Pettis, N. C. xxii, 468.
Pile, Wilson H. xxix, 497.
Platzer, Robert. xxii, 468.
Plummer, George B. xxx, 613.
Porter, Henry C. xxv, 493.
Preston, Alfred. xxvii, 769.
Procter, Jr., William. xxii, 469.
Reinold, Bernard H. xxv, 489.
Rideout, James W. xxviii, 519.
Ritson, Alfred. xxvii, 769.
Robinet, Stephane. xviii, 24.
Ræmer, Daniel. xix, 39.
Ross, George. xxix, 495.
Sackrider, Edward W. xxi, 40.
Schmidt, Henry. xxiv, 587.
Schmidt, William G. xxv, 490.

Obituary notices. (Continued.)

- Scott, David.* xxvi, 863.
Selfridge, Matthew M. xxix, 498.
Smith, Edward A. xxiv, 587.
Smith, John W. xxiv, 585.
Smith, Samuel A. xxiv, 584.
Snowden, George M. xxix, 499.
Stabler, Richard H. xxvi, 865.
Stephens, William G. xxvi, 864.
Suding, Henry A. xxiv, 587.
Taylor, R. J. xx, 30.
Taylor, William. xix, 39, 42.
Tully, Andrew J. xxiii, 766.
Uhl, Charles F. xxii, 468.
Warren, Charles Henry. xxiv, 587.
Warren, William. xix, 39.
Watson, William J. xxi, 39.
Watson, William P. xx, 30.
Weaver, J. Thornton. xxx, 612.
Wiggers, Heinrich A. L. xxviii, 521.
Willard, Joseph. xxvi, 863.
Wilson, Adam H. xxix, 498.
Wood, Geo. B. xxvii, 767.
Young, John E. xxx, 615.

Oblatæ amylicæ, see **WAFER CAPSULES**.

Ochoco, a spec. of **Dryobalanops**, Africa. xxix, 116.

Ochra, see **HIBISCUS ESCULENTUS**.

Ochrosia BORBONICA, Island of Bourbon. xxvii, 171.

Ocimum PILOSUM, India, descript., Dymock. xxvi, 159.

Ocote = **Pinus teocote**, Mexico. xxiv, 768, 770.

Ocimum BASILICUM, as anthelmintic, Arg. Republ. xxviii, 128—fruit in fever, Turkestan. xxi, 221.

— **VIRIDE**, Liberia, descript., Holmes. xxvi, 168.

Odina WOODIER, India, exam. of gum, Masing. xxix, 213—descript., Dymock. xxv, 220.

O'Donnell, J. D. Tinct. opii deodorata. xxiv, 489.

Oel, see also **OIL**.

—, **LATSCHEN**—oil of dwarf pine. xxvi, 438;—**O.**, **KIEN**—oil templin. xxvi, 438;—**O.**, **KRUMMHOLZ**—oil dwarf pine. xxvi, 438.

Oenanthol, prep. xxvi, 501.

Oenokrine (—test paper for red wines), Miller. xxvi, 267.

Oenolin, prep., Glénard. xxiv, 385; Varenne. xxvi, 625.

Oenothera BIENNIS, Kansas. xxix, 448;—**O.** **PRIMULOIDES**, California. xix, 301.

Officers of the Association: 1870-71. xviii, 3; 1871-72. xix, 3; 1872-73. xx, 3; 1873-74. xxi, 3; 1874-75. xxii, 3; 1875-76. xxiii, 3; 1876-77. xxiv, 3; 1877-78. xxv, 3; 1878-79. xxvi, 3; 1879-80. xxvii, 3; 1880-81. xxviii, 3; 1881-82. xxix, 5; 1882-83. xxx, 3.

Officers of the Association, elected: xviii, 48; xix, 50; xx, 45; xxi, 54; xxii, 491; xxiii, 759; xxiv, 594; xxv, 500; xxvi, 870; xxvii, 770; xxviii, 512; xxix, 491; xxx, 601.

Officers since organization: xviii, 6; xix, 7; xx, 7; xxi, 7; xxiii, 7; xxiv, 7; xxv, 6; xxvi, 6; xxvii, 6; xxviii, 6; xxix, 8; xxx, 6.

— See also **COUNCIL**.

O'Gallagher, James. xix, 32, 33, 43, 75.

Ohio, pharmacy law. xix, 356; xxi, 505, 6.

Oh-ren—**Coptis anemonæfolia**, Japan. xxviii, 164.

Oil-cake, adult. (with ricinus seed), Vigener. xxiii, 191.

Oil-seeds, **AFRICAN**, descript., Möller. xxix, 115—**INDIAN**. xxiv, 721.

"**Oil-seeds**," **MAURITIUS**,=fruit of **Calophyllum inophyllum**. xxvi, 256.

"**Oil-tree**," China,=**Elæococca vernicia**. xxiv, 202.

Oils, mix clear with glacial acet. acid, Barnes. xxiv, 320; Lyman. xxiv, 321—act. of metallic ferricyanides, Bong. xxvi, 369.

Oils, drying, bleached (charcoal and sunlight), Mulder. xviii, 206; (manganic oxyhydrate). xxvii, 432.

—, **essential**, adult., Dubelle. xxiv, 272; (see **DETECTION** below)—Centennial exhibit. xxiv, 815—cohesion figures, Krane. xxiii, 322—dark color removed by tart. ac., Hogan. xxv, 272—"CON-

Oils, essential. (Continued.)

CENTRATED, Hænsel. xxv, 366; (by fract. distils.). xxviii, 263—constitut., Tilden. xxvi, 436—**DETECTION** of alcohol, Barbier (fract. dist. with acet. pot.). xxviii, 263; xxx, 320; Boettger. (anhydr. glyc.). xxi, 322, 485; xxvi, 435; Davy (sulphomolybdic ac.). xxvi, 475; Drechsler (bichrom. pot. and nitr. ac.). xxvii, 379; xxix, 286; Leonhardi (anilin red). xxvi, 435; (drawbacks of anilin red test, Stuart. xxx, 320); Stuart (iodoform test). xxx, 321—detect. of oil of copaiva (burning with wick), Schramm. xxi, 323; of fatty oils (steam), Rhien. xxi, 485; (burning with wick), Schramm. xxi, 323; of oil of turpentine (alcohol), Dragendorff. xxi, 320—see also **TESTS**—drop equivalent, Talbot. xxix, 34—emulsion (in the bottle), Forbes. xxi, 134—estimat. in plants (petrol. ether), Osse. xxiv, 275—**EXTRACTION**: Perrenoud. xxiv, 272; by absorption. xxiv, 275; by benzin, Wolff. xxv, 271; by distillation. xxiv, 272; by expression. xxiv, 273; by infusion. xxiv, 274—estimat. of fat (by steam), Rhien. xxi, 322—and orange-colored glass, Proctor. Jr. xxi, 629—preservation, Moore. xxvii, 379—"POSITIVE," see below—oxidat. theory of the form. of resins, correct, Dragendorff. xxviii, 262—solubility in alc., Gault. xxi, 321—still, Drew, Heywood, Barrow. xxix, 286; Melnikoff. xxx, 317; Schimmel & Co. xxix, 285—**TESTS**: color react., Dragendorff and Kassow. xxvi, 433; with mur. ac., Ommen. xxiv, 277; alcohol and water, Dragendorff. xxiv, 277; sulph. and nitr. ac., precautions, Flückiger. xix, 155; opalescent alcohol test, Hager. xxx, 318—contain water. xxi, 485; when dist. with water, always cont. it, Leuchs. xxii, 213.

— **essential**, in France. xxiv, 822; xxvii, 380.

— **fixed (FATTY)** estimat. of free acid (alc.), Burstynn. xxi, 345; xxiv, 301; (sod. carb.), Rumpier. xix, 145—adult. tests, Coleman. xxiii, 355; (streaks with genuine oil), Merz. xxvi, 498; (conc. sulph. ac.), Flückiger. xix, 153—bleached (permang. pot.). xix, 152—cohesion figures, Krane. xxiii, 322—drop equivalents, Talbot. xxix, 34—extract. by bisulphide carbon, Heyl & Co. xxiv, 793—heat developed by sulph. ac., Maumené. xxviii, 287—act. of peroxide hydrogen. Cohné. xxiv, 302—literature, Ludwig. xxi, 345—estimat. of mineral (paraffin) oils (alc. sol. soda), Thompson. xxvii, 425—pallet for assay, Dufour and Rouaix. xxviii, 287—purified (ammonia), Keyser. xix, 154—spectroscopically, Gilmour. xxvi, 301; xxv, 280—act. of pentachlor. sulph., Mercier. xxvi, 346—test for sulphuretted oils (mustard, etc.), Gréhaut. xix, 266.

— **inflammable**, examin., Foote. xxi, 143.

— **mineral**, see also **PETROLEUM** and **OIL**, **PARAFFIN**—account of works at Rehmsdorff (Germany). xxiv, 794—deodorized, uses in pharmacy, Masson. xxv, 270—purified (alc., chlor. lime, soda), Riebeck. xxix, 284—detect. in linseed oil (sod., benzin). xxiii, 503.

— "**positive**," Hænsel. xxv, 366; xxviii, 263.

— **volatile**, see **OILS**, **ESSENTIAL**.

Oil (OLEUM).

— **ABIES PECTINATA (ABIETIS PINI)**. xxvi, 438.

— **ACHILLEA AGERATUM**. xxiv, 143, 279.

— **ACHILLPA MOSCHATA**. xix, 285; xxix, 158.

— **ALBURITES TRILOBA**, account in Jamaica. xxiv, 732—cathartic action, Oxamendi. xxiii, 223—yield, Nallino. xxi, 260.

— **ALLSPICE** and glac. acet. ac., Barnes. xxiv, 321—color reactions, Kossow. xxvi, 434.

— **ALMOND, BITTER**, and glac. acet. ac., Barnes. xxiv, 321—adult. xxi, 484; xxiii, 504; Boiveau. xxviii, 269—constitution, Fileti. xxviii, 270—

IODIZED, Blackwell. xxvii, 391, 2—**NITROBENZOL** detected: (potassa) Henninger and Bourgoin. xxi, 254, 323; (pot., and sulphur), Brunner. xxx, 265; (convers. into rosanilin), Flückiger. xix, 154; (pot., ferric chlor.), Pegna. xxvii, 392—solubility in water, Flückiger. xxiv, 283—opalescent alcohol test, Hager. xxx, 319.

— **ALMOND, BITTER, ARTIFICIAL** of Wilhelmi (not nitrobenzol). xxiv, 793—identical with true oil, Lippmann and Hawliczeck. xxv, 31, 274.

Oil (OLEUM). (*Continued.*)

- ALMOND, EXPRESSED, SWEET, and glac. acet. ac., Barnes. xxiv, 320; Lymons. xxiv, 321—adult. xxiii, 504; xxvi, 499—account of extr. in Italy. xxv, 375—difference fr. that expr. fr. bitter almonds, Hager. xix, 152—test of purity: xix, 152; Bieber. xxvi, 499; Hager. xix, 152.
- ALMOND, EXPRESSED, SWEET, ARTIFICIAL = Donner Co's paraffin. xxv, 522.
- ALOES (essential), Craig. xxiii, 133.
- AMBER, RECTIFIED—opalesc. alcohol test, Hager. xxx, 319
- ANDA-ASSU as cathartic. xxx, 250—prop. xxvii, 267.
- ANETHUM, see OIL, DILL.
- ANGELICA (fr. root) opalescent alc. test, Hager. xxx, 319—yield (France). xxvii, 380.
- ANGELICA (fr. seed), prop. and constitution, Maudain. xxx, 328—opalescent alc. test, Hager. xxx, 319.
- ANGOSTURA bark, yield and prop., Oberlin and Schlagdenhauffen. xxvi, 448.
- ANISE and glac. acet. ac., Barnes. xxiv, 321—adult. (oil fennel up to 90 p. c.) Leonhardi. xxvi, 435—behav. to chem. reagents, Eyckman. xxix, 184—color react., Kossow. xxvi, 434—drug market. xix, 399; xx, 125; xxii, 637; xxvi, 657; xxvii, 560; xxx, 468—opalesc. alc. test, Hager. xxx, 319.
- ANISUM STELLATUM, see OIL, STAR ANISE.
- ANTIDOTE CACON, Jamaica. xxiv, 732.
- ARACHIS HYPOGÆA, see OIL, PEANUT.
- ASARUM CANADENSE, Boerner. xxvi, 903—analysis, Power. xxviii, 470—yield, Squibb. xxviii, 471.
- ATHEROSPERMA MOSCHATA. xxi, 262.
- AURANTIUM, see OIL, ORANGE.
- BALSAM PERU (essential), decomp. by distill., Kachler. xviii, 284—constitut., Kraut. xviii, 283.
- BAY (= laurel), see OIL, LAUREL.
- BAY (= bay rum), drug market. xxi, 439—account, yield, etc., Markoe. xxv, 436, 542.
- BEN, fr. *Moringa pterygosperma*, Jamaica. xxiv, 732.
- BENZOIN ODORIFERUM, Gleim. xxiii, 162—yield, prop., Miller. xxvi, 772.
- BERGAMOT and glac. acet. ac., Barnes. xxiv, 321—adult. xxiii, 504; (oil orange), Leonhardi. xxvi, 435—color react., Kossow. xxvi, 434—drug market. xxii, 637; xxiv, 397; xxv, 349; xxvi, 657; xxvii, 560; xxx, 468—white precipit. often cont. lead, Dannenberg. xxv, 272—opalesc. alc. test, Hager. xxx, 319.
- BETULA LENTA, manuf. and substit. for oil wintergreen, Kennedy. xxx, 335.
- BETULINUM (= birch tar). xxix, 234.
- BIRCH, see OIL BETULA LENTA.
- , BLACK, = palm oil. xxiv, 741.
- BOLDO, Verne. xxiii, 335.
- BUCHU, Osse. xxiv, 276—act. of caustic soda, Flückiger. xxix, 288.
- CADE = juniper tar. xxvi, 325—adult. xxi, 485; xxiv, 405—opalesc. alc. test, Hager. xxx, 319.
- CAJAPUT in infantile eczema, Claiborne. xxx, 321—and glac. acet. ac., Barnes. xxiv, 321—cont. borneol. xxviii, 474—color react. xxvi, 434—constitut., Schmidt. xxiii, 332—cont. copper, Histed, xxii, 308—opalesc. alc. test, Hager. xxx, 319.
- CALAMUS and glac. acet. ac., Barnes. xxiv, 321—constitut., Kurbatow. xxiii, 332—products of fractional distillat., Kurbatow. xxii, 214—opalesc. alc. test, Hager. xxx, 319—yield. xxiv, 276, Osse.
- CALOPHYLLUM CALABA, Jamaica. xxiv, 732.
- CALOPYLLUM INOPHYLLUM. xxvi, 256.
- CALPÉ, Manila. xxiv, 831.
- CAMPHOR (natural) is a complex body, Beckett and Wright. xxiv, 270—crystall., Japanese, Beckett and Wright. xxiv, 270.
- CANDLEBERRY NUT, see OIL, ALBURITES TRILOBA.
- CANNABIS SATIVA (essential), prop., Valente. xxix, 290.
- CARAPAT fr. seeds of *Swietenia mahogany*. xxvi, 269.

Oil (OLEUM). (*Continued.*)

- CARAWAY and glac. acet. ac., Barnes. xxiv, 321—adult., Leonhardi. xxvi, 435—color react., Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 319.
- CARBON = crude petroleum. xxi, 444.
- CARDAMOM, color react., Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 319.
- CAROPHYLLUS, see OIL, CLOVES.
- CASCARILLA, yield, Osse. xxiv, 276.
- CASHEW NUT, Jamaica. xxiv, 731.
- CASSIA and glac. acet. ac., Barnes. xxiv, 321—adult., Hager. xxiii, 331, 504—color react., Kossow. xxvi, 434—drug market. xix, 395, xx, 125; xxii, 638; xxv, 349; xxvi, 657; xxvii, 560; xxx, 468—distinct. test fr. oil cinnamon (nitric ac.), Woodland. xxx, 154—fresh, does not mix in all proport. with alc., Hager. xxiii, 332—opalesc. alc. test, Hager. xxx, 319.
- CASTOR and glac. acet. ac., Barnes. xxiv, 321—cause of acidity, Buchheim. xxii, 241—ADMINISTRAT., see also EMULSION, CASTOR OIL; effervescing, Fairthorne. xxix, 83; mucilage, peppermint, Gregory. xxii, 67, 8—as bolus with sugar or comp. licorice powder, Harcke. xxvii, 95; yolk and brandy, Perschne. xxx, 98; orange juice, Potain. xxiii, 78; glycerin, oil cinnamon. xxi, 133; anise, chloroform. xxii, 68—ADULT. (whale oil). xxi, 482; (lard oil, croton oil). xxiii, 499; detect. of adult., (alc.; benzin), Hager. xxiv, 304, 5—contamin. (scraps of tin). xxi, 503—products of distill. under diminished pressure, Krafft. xxvi, 501; xxvii, 432—drug market. xix, 395; xx, 126; xxi, 439; xxii, 638; xxv, 338, 343, 349; xxvi, 659; xxvii, 559, 560, 578; xxx, 469—makes many coloring substances fluorescent, Horner. xxiii, 460—blue react. with tinct. guaiac, Arnold. xxx, 452—when extract. by ether is more active than when expressed, Bodam. xxix, 304—manufacture, Raab. xxviii, 194; in California. xxvii, 628; in India. xxiii, 223; xxiv, 723—solubility in alc. depends largely on temp., Hager. xxiv, 305.
- CEDAR WOOD, color react., Kossow. xxvi, 434—adult. xxiii, 495—in Canada. xxv, 338.
- CELERY, yield (France). xxvii, 380.
- CHAMOMILE (ESSENTIAL) and glac. acet. ac., Barnes. xxiv, 321—adult. (castor oil, alc., litmus). xxiv, 405—constitution (angelate and val. of butyl amyl), Demarçay. xxii, 221—identical with blue oil galbanum, Kohler. xxi, 225.
- CHAMOMILE (INFUSED). xxi, 484.
- CHAMOMILE, ROMAN, cont. tiglic acid, Fittig and Köbig. xxvi, 449—products of fract. distill. xxiv, 278.
- CHAMPACA, Manila. xxiv, 767.
- CHAULMOOGRA (= *Gynocardia*), detect. of adult. (sulph. ac.), Dymock. xxiv, 306—constituents, Moss. xxviii, 289.
- CHENOPodium, see OIL WORMSEED.
- CHERRY SEEDS, expressed, Guyot. xxv, 207.
- CHERRY LAUREL, analysis, Tilden. xxiii, 336—constitution, Fileti. xxviii, 270—detect. of nitrobenzol, Pegna. xxvii, 392—yield, Umney. xxvii, 392.
- , CHLORINATED, Wolff. xxx, 362.
- CINNAMON (CEYLON) and glac. acet. ac., Barnes. xxiv, 321—adult. (sassafras, cloves), Brown. xxiii, 504—distinct. test fr. oil cassia (nitr. ac.), Woodland. xxx, 154—drug market. xxii, 638—opalesc. alc. test, Hager. xxx, 319.
- CINNAMON, "HEAVY" is fr. the leaves. xxiii, 504.
- CINNAMON "LEAF," prop., Kuhn. xxv, 272.
- CINNAMOM. LOUREIRI, Japan, prop., Martin. xxvii, 147.
- CITRON and glac. acet. ac., Barnes. xxiv, 321.
- CITRONELLA and glac. acet. ac., Barnes. xxiv, 321—cont. borneol. xxviii, 474—constitution, Wright. xxiii, 333—drug market. xxvii, 560.
- CLOVES and glac. acet. ac., Barnes. xxiv, 321—adult. (40 p. c. of lighter oil), Schær. xxiv, 280, 406; (carbol. ac., copaiba bals.). xix, 336; detect. of carbol. ac., Flückiger. xxiv, 406; Hager. xix, 155, 6—color react., Kossow. xxvi,

Oil (OLEUM). (*Continued.*)

- 454—drug market. xxvii, 560—extract. with bisulph. carbon, Ender. xxviii, 265—reducing power due to eugenic ac., Boettger. xxviii, 265—opalesc. alc. test, Hager. xxx, 319—production of vanillin. xxx, 444—yield, Osse. xxiv, 276.
- COAL-, for isolating alkaloids, Boiraux and Léger. xxiii, 318—act. of bromine, Allen. xxx, 314.
- COAL, CARBOLIZED. xxiii, 319—for isolating alkaloids, Boiraux and Léger. xxiii, 319.
- COALTAR, HEAVY, as an antiseptic, Dusart. xxiii, 318.
- COCHLEARIA, constitution, Hoffmann. xxii, 223; differs fr. that of oil mustard, Hoffmann. xviii, 289—synthetically, Hoffmann. xxii, 224.
- COCONUT, Jamaica. xxiv, 731.
- COD LIVER and glac. acet. ac., Barnes. xxiv, 320; Lymons. xxiv, 321—administration, see also EMULSION, COD LIVER OIL, and MIXTURE, COD LIVER OIL; yolk of egg, Pentevés. xxix, 84; eucalyptus oil, Duquesnel. xxi, 267—adult. xxviii, 208—leaves no ash on incineration, Vanderburg. xxix, 304—analysis, Schaper. xviii, 253—drug market. xxi, 439; xxii, 638; xxvi, 659; xxx, 469—determin. of iodine, Barral. xxvi, 331; p. c., Bird. xxx, 254—relation of iod and brom. to therapeut. value, Carles. xxx, 253—metals best combined as benzoates, Gadin. xxi, 267.
- COD LIVER, *Alaska*. xxvii, 628—*Newfoundland*. xix, 153—*New Hampshire*, Marvin. xxiii, 658; Procter, Jr. xviii, 253—*Norway*. xxiv, 809; xxv, 238; Krohn. xxviii, 207.
- COD LIVER: with *aspidospermina*, Burgos. xxviii, 61—*bread*. xxii, 173—*chloral hydrate*. xix, 154—*ferrated*, Bernbeck. xxiv, 87; Strohmeyer. xxix, 84; Valkenburg. xxx, 99; Müller (benzoate). xxii, 69; Bell (chlor. and lactic ac.), xxvii, 98—*emulsion*, see EMULSION, COD LIVER OIL—*hypophosphites*; see also EMULSION—*iodinized*, Blackwell. xxvii, 29, 98—*iodoferrated*, Cumiskey. xxi, 335; Valkenburg. xxix, 85—*iodoform*, Fonsagrives. xxix, 85—*jelly*, see JELLY—*pancreatin*, Plumb. xxiii, 80; see also EMULSION, COD LIVER OIL—*phosphorus*, xxvii, 92; Squibb. xxiv, 474—*quinia*, Stiles. xxiii, 80.
- COFFEE, Bernheimer; Cech. xxix, 165.
- COLCHICUM SEED, yield, prop., Bœrner. xxvi, 761.
- COLOCYNTH, yield, Flückiger. xxi, 245.
- COLZA, see OIL, RAPE.
- COPAIVA and glac. acet. ac., Barnes. xxiv, 320—color react., Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 319.
- CORIANDER and glac. acet. ac., Barnes. xxiv, 321—adult., Leonhardi. xxvi, 435—cont. borneol. xxviii, 474—color react., Kossow. xxvi, 434—constitut., behav. to reagents, Grosser. xxx, 323—opalesc. alc. test, Hager. xxx, 319.
- COTTONSEED, cont. a yellow, unsaponifiable body, Rœdiger. xxx, 365—export to and uses in Italy, Duncan. xxix, 304—prep., prop., yield, xxviii, 290; Scheibe. xxx, 364—statistics. xix, 510.
- CROTON and glac. acet. ac., Barnes. xxiv, 321—its volatile acids, Geuther. xviii, 253; Schmidt and Berendes. xxvii, 433—cold pressed as active as hot pressed, Kühn. xxiv, 305—commercial cont. often castor oil, Julliard. xxx, 365—constitut., Buchheim. xxii, 241—soluble in alc., prep., yield, Julliard. xxx, 365—solubility in alc. increases with age, Senier. xxvi, 501.
- CUBEBS and glac. acet. ac., Barnes. xxiv, 321—color react., Kossow. xxvi, 434—cannot be distilled alone without decomposition, Schær and Wyss. xxiii, 331—yield; product of fractional distillation, Ogliastro. xxiv, 278—solubilities, Schmidt. xviii, 274—opalesc. alc. test, Hager. xxx, 319.
- CUCUMBER, W. Proctor, Jr. xxi, 602.
- CUMIN and glac. acet. ac., Barnes. xxiv, 321.
- CURCAS PURGANS, prep. of capryl alcohol, Silva. xviii, 249.
- CURDY SEED, fr. *Carthamus tinctorius*, India. xxiv, 722.

Oil (OLEUM). (*Continued.*)

- CYNÆ, see OIL SANTONICA.
- DILL, color react., Kossow. xxvi, 434—constitut., products of fract. distill., Nietzki. xxii, 220—opalesc. alc. test, Hager. xxx, 319.
- DUGONG (*Halicore australis*), Queensland. xxiv, 740.
- DWARF PINE (*Pinus pumilio*), Godeffroy. xxvi, 438—color react., Kossow. xxvi, 434.
- EGUSI (bitter gourd), Gold Coast. xxiv, 741.
- ELÆOCOCCA VERNICIA, China, dries in a few hours, Cloëz. xxiv, 702.
- ELAIS GUINEENSIS, Africa collect.. Soyaux. xxviii, 105.
- ERIGERON, adult. xxiii, 505—behav. to reagents; detect. in oil peppermint, Vigier and Cloëz. xxx, 327—test of purity, Weeks. xx, 242.
- EUCALYPTUS and glac. acet. ac., Barnes. xxiv, 321—as adulterant of ess. oils. xxi, 484—color react., Kossow. xxvi, 434—constitut., Cloëz. xix, 275—prop., yield, etc., Bosisto. xxi, 247—as solvent for resins, etc., Osborne. xxvii, 234—uses in surgery, Siegen. xxix, 289—opalesc. alc. test. xxx, 319.
- EUCALYPTUS AMYGDALINA yield, Bosisto. xxiv, 806; xxvii, 234;—E. CITRIODORA. xxiv, 806;—E. CORYMBOSA. xxi, 248;—E. FISSILIS. xxi, 249; xxiv, 806.
- EUCALYPTUS GLOBULUS, constitut., Cloëz. xix, 275; Homeyer. xxiii, 206; 334—physiolog. prop. xxiv, 805—yield. xxi, 248; xxvii, 234.
- EUCALYPTUS GONIOCALYX. xxiv, 806; xxi, 248; xxvii, 234;—E. LEUCOXYLON. xxi, 248; xxvii, 234;—E. LONGIFOLIA. xxi, 249;—E. OBLIQUA. xxi, 249; xxvii, 233;—E. ODORATA. xxi, 249;—E. OLEOSA. xxi, 247; xxiv, 806; xxvii, 234;—E. PERSICIFOLIA. xxiv, 806;—E. ROSTRATA. xxi, 249;—E. SIDEROXYLON. xxiv, 806;—E. STUARTIANA. xxiv, 806;—E. VIMINALIS. xxi, 250.
- EXPLOSIVE, DULONG'S=chloride of nitrogen. xxvii, 305.
- FENNEL and glac. acet. ac., Barnes. xxiv, 321—behav. to reagents, Eyckman. xxix, 184—color react., Kossow. xxvi, 434—opalescent alc. test, Hager. xxx, 319—yield (France). xxvii, 380.
- FEUILLEA CORDIFOLIA, Jamaica. xxiv, 732.
- , FISH, as salad oil (Menhaden). xxii, 309—test in linseed oil. xxii, 242; xxiii, 502.
- FULMAR GLACIALIS (a petrel). xix, 153.
- FUSEL, see ALCOHOL, AMYLIC.
- GALANGAL, color react., Kossow. xxvi, 434.
- GALBANUM (blue), identical with oil chamomile, Kohler. xxi, 225.
- GARDEN CRESS (*Lepidium sativum*), constitution, Hoffmann. xxiii, 336.
- GAULTHERIA PROCUMBENS (wintergreen), adult. (chlorof., oil sassafras), Bullock; Pile. xxii, 217, 309; xxiii, 506; xxiv, 406—antiseptic value, Gosselin and Bergeron. xxx, 336—substit. by oil betula lenta, Kennedy. xxx, 335—drug market. xx, 126, 143; xxi, 440; xxii, 639; xxiv, 397; xxv, 350; xxvi, 658; xxvii, 560; xxx, 469—odor destroyed by phosphorus, Menninger. xxiv, 623—production, Brakely. xxviii, 269—opalesc. alc. test, Hager. xxx, 320.
- GAULTHERIA, ARTIFICIAL, fr. artif. salicyl. ac., Williams. xxiii, 351.
- GAULTHERIA LEUCOCARPA;—G. PUNCTATA, Köhler. xxvii, 393.
- GERANIUM (fr. *Andropogon*), Langebeck. xxvi, 447.
- GERANIUM, ROSE, see OIL, ROSE GERANIUM.
- GINGELLY (*Sesamum indicum*), Jamaica. xxiv, 732.
- GINGER (ESSENTIAL), color react., Kossow. xxvi, 434—prop., Thresh. xxx, 322.
- GINGER GRASS (fr. *Anatherum andropogon*), adulterant of oil rose. xxi, 253—= oil palma rosa. xxiii, 506.
- GYNOCARDIA, see OIL CHAULMOOGRA.
- , HAIR-, perfume, cheap, Ebert. xxiii, 118.
- HEDYOSMUM NUTANS, Jamaica, uses, Holmes. xxx, 208.
- HEMLOCK, adult. xxiii, 495—in Canada. xxv, 338.

Oil (OLEUM). (*Continued.*)

- HEMPSKED, test in linseed. xxiii, 503—yield and prop., Betz. xxvi, 500.
- HOPS, cont. borneol. xxviii, 274.
- HORSEMINT, see OIL MONARDA.
- HURA CREPITANS, Jamaica. xxiv, 732.
- HYDRASTIS CANADENSIS, essential and fixed, Lloyd. xxvi, 804.
- HYSSOP, yield (France). xxvii, 380.
- IDRIS (fr. *Anatherum andropogon*), as adulterant of oil of rose. xxi, 253.
- ILICIUM RELIGIOSUM, behav. to reagents, Eyckman. xxix, 184.
- IVA, see OIL ACHILLEA MOSCHATA.
- JABORANDI root, prop., Peckolt. xxiv, 161—Pöchl. xxviii, 340.
- JUNIPER (BERRIES) and glac. acet. ac., Barnes. xxiv, 320—adult., Miller. xxiii, 505—color reactions, Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 319.
- JUNIPER (WOOD), color react., Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 319.
- JUNIPER, EMPYREUMAT., see OIL CADE.
- KAURI GUM, prop. and constituents, Muir and Rennie. xxx, 324.
- KREPPER, Gold Coast. xxiv, 741.
- LAMPREY, Russia. xxvi, 331.
- LAUREL (BERRIES), ESSENTIAL, color react., Kossow. xxvi, 434—prop., Osse. xxiv, 276.
- LAUREL (BERRIES), EXPRESSED, green color removed by alc., Betz. xxvi, 500—prop., Osse. xxiv, 276.
- LAUROCERASUS, see OIL CHERRY LAUREL.
- LAVENDER and glac. acet. ac., Barnes. xxiv, 321—adult. (75 p. c. turp.) xxiii, 496—color react., Kossow. xxvi, 434—distillation and yield in England. xxi, 219; xxiv, 820; xxvi, 210—in France. xxiv, 823; xxvii, 381—opalesc. alc. test, Hager. xxx, 319.
- LEDUM PALESTRE, color react., Kossow. xxvi, 434—prop., Tropp. xxiv, 282.
- LEMON and glac. acet. ac., Barnes. xxiv, 320; Lymons. xxiv, 321—adult. xix, 376; (up to 67 p. c.). xxiii, 495; 505—cont. borneol. xxviii, 474—color react., Kossow. xxvi, 434—distilled, prop. and comp., Tilden. xxvii, 388; products of fract. distillat., Moss. xxvii, 388, 390—drug market. xix, 396; xx, 126; xxi, 439; xxii, 638; xxiv, 397; xxv, 350; xxvi, 657; xxvii, 560; xxx, 468—apparatus for extracting. xxvii, 386—white precipitat. often contains lead, Dannenberg. xxv, 272—preserved by water, Bond. xxii, 215—opalesc. alc. test, Hager. xxx, 320—production in Greece. xxiv, 170; xxix, 195;—Italy. xxvii, 388.
- LEMONGRASS and glac. acet. ac., Barnes. xxiv, 320—opalesc. alc. test, Hager. xxx, 320.
- LIMETTA (lime), constituents. Piesse and Wright. xxvi, 440—opalesc. alc. test, Hager. xxx, 320.
- LINALOES, constitut. and prop., Morin. xxx, 324.
- LINSEED and glac. acet. ac., Barnes. xxiv, 320; Lymons. xxiv, 321—adult. (fish oil). xxii, 308; detect., Morrell. xxii, 242; xxiii, 502; (mineral oil). xxiii, 503; (rosin oil). xxi, 482; xxiii, 503—bleached (alc., sulph. ac.), Puscher. xxi, 345—blue react. with tinct. guaiac, Arnold. xxx, 452—yield, Kaspar. xxix, 194—manuf. in California. xxvii, 631; India. xxiv, 721.
- LITHUANICUM—birch tar. xxix, 234.
- LUBRICATING, act. of bromine, Allen. xxx, 314.
- MACASSAR, probably made with oil of carthamus seed, in India. xxiv, 722.
- MACE, opalesc. alc. test, Hager. xxx, 320.
- MALE FERN and glac. acet. ac., Barnes. xxiv, 321.
- MARJORAM, SWEET and glac. acet. ac., Barnes. xxiv, 321—color react., Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 320—yield (France). xxvii, 381.
- MASTIC (essential) yield, Flückiger. xxx, 246; Mayer. xxx, 222.
- MELALEUCA ERICIFOLIA;—M. CURVIFOLIA;—M. GENISTIFOLIA;—M. LINARIFOLIA;—M. SQUARROSA;—M. UNCINATA;—M. WILSONII, yield and prop., Bosisto. xxi, 251, 2.

Oil (OLEUM). (*Continued.*)

- MELISSA, adult. xxiii, 505—commercial is generally oil citronella. xxvii, 384—opalesc. alc. test, Hager. xxx, 320.
- MENTHA AUSTRALIS, Australia. xxi, 219.
- MENTHA CRISPA, color react., Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 219.
- MENTHA GRACILIS;—M. GRANDIFLORA, Australia. xxi, 219.
- MENTHA PIPERITA, see OIL PEPPERMINT.
- MENTHA VIRIDIS, see OIL SPEARMINT.
- MIRBANE, see NITROBENZOL.
- MONARDA DIDYMA cont. thymol, Brunn (1796). xxvi, 441.
- MONARDA PUNCTATA cont. thymol, Arppe (1846). xxvi, 441, 2; Maisch. xxx, 617.
- MUSCOVITICUM—birch tar. xxix, 234.
- MUSTARD, ESSENTIAL and glac. acet. ac., Barnes. xxiv, 321—adult. (oil wintergreen), Hager. xxii, 223, 309—compound with bisulphite pot., Böhrer. xix, 266—detect. of bisulph. carb., Flückiger. xxix, 290; Hager. xxviii, 271; Johansen. xxx, 334; Luck. xxii, 222—detect. of carbolic ac., Hager. xxviii, 271—format. prevented by perchloride iron, Almés. xxiv, 244—test of purity, Hager. xxviii, 270—solubility in water, Hager. xxiv, 296—opalesc. alc. test, Hager. xxx, 320.
- MUSTARD, ESSENTIAL, ARTIFICIAL, constitut., Mylius. xxv, 275—fr. iodide allyl. xxiii, 337—see also ALLYL, SULPHOCYANIDE.
- MUSTARD, EXPRESSED, as substit. for olive oil in ointments and cerates, Rother. xxiv, 65, 305—product. in California. xxvii, 631.
- MYRISTICA, see OIL NUTMEG.
- MYROXYLON PERUIFERUM, fr. bark and leaves, Peckolt. xxvii, 244—fr. wood, Peckolt. xxix, 215.
- MYRTLE and glac. acet. ac., Barnes. xxv, 321—prop. and uses. xxvii, 235—yield (France). xxvii, 381; (England), Piesse. xxiv, 187.
- NASTURTIUM OFFICINALE, constitution, Hoffmann. xxii, 222.
- NEATSFOOT, adult. xxi, 483.
- NEROLI and glac. acet. ac., Barnes. xxiv, 321—adult. xxi, 484—opalesc. alc. test, Hager. xxx, 320—yield of "bigarade" fr. flowers of *Citrus bigaradia*, and "petit-grain" fr. leaves of bitter orange (France). xxvii, 383.
- "NEUTRAL" for adult. fixed oils generally. xxi, 483.
- NUTMEG (ESSENTIAL) and glac. acet. ac., Barnes. xxiv, 321—color react., Kossow. xxvi, 434—products of fract. distill., Wright. xxii, 216.
- NUTMEG (EXPRESSED), sp. gr., Hager. xxvii, 424.
- OLIBANUM, constitut., Kurbatow. xxiii, 333.
- OLIVE and glac. acet. ac., Barnes. xxiv, 320; Lymons. xxiv, 321—absorbs 5-600 vols. atmospheric air. xxiv, 626—adult. (petroleum), Bedford. xix, 95; (cottonseed and other oils). xix, 337, 508; xxi, 483; xxiii, 506—test for adult. (heat to 212° F. for 12 hrs.), Merz. xxvi, 498—detect. of copper, Cailletet. xxvi, 500; of seed oil, Conroy. xxix, 303; of beet root and mustard seed oils, xxx, 364; of cottonseed oil. xxx, 364; Røediger. xxx, 365; of peanut oil, Renard. xxi, 218; of sesame oil. xxx, 364—drug market. xix, 401; xxi, 439, 449—blue react. with tinct. guaiac, Arnold. xxx, 452—prop. of sun-bleached, Moschini. xxi, 217—test for purity, Codina Langlin. xix, 153—tests unreliable in certain conditions, Moschini. xxiii, 358—yield. xxix, 140; xxx, 170—influence of fermentation on yield, Planchard. xxix, 141—product. in California. xxi, 216; xxv, 139; xxvii, 613; in Portugal. xxiv, 815; in Tunis. xxii, 107. See also OLIVE.
- OALACHAN, California. xxvii, 631.
- ORANGE (BITTER) and glac. acet. ac., Barnes. xxiv, 321—color react., Kossow. xxvi, 434—products of fract. distillat., Wright. xxii, 215—prop., Stabler. xxii, 391—opalesc. alc. test, Hager. xxx, 320.
- ORANGE (SWEET), color react., Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 320.

Oil (OLEUM). (*Continued.*)

- ORHODAPHNE CALIFORNICA, Heamy. xxiii, 145, 334, 5—prop., constitution, Stillmann. xxviii, 264.
- ORIGANUM VULGARE and glac. acet. ac., Barnes. xxiv, 321—adult. (75 p. c. alc.), Ballard. xxvi, 442; (turp.). xxiii, 496, 505—Eastern is rich in carvacrol, the French is poor, Jahns. xxviii, 265—commercial has thymol already extracted, Gerrard. xxvi, 442.
- ORIGANUM, SPANISH (CRETICUM), yield (France). xxvii, 381.
- ORIGANUM HIRTUM, prop., constitut., Jahns. xxviii, 265.
- ORIGANUM, SMYRNA, is fr. O. vulgare. xxi, 220.
- ORRIS ROOT. xxi, 209—prop., Hager. xxiii, 333—cont. myristic ac., Flückiger. xxiv, 279—yield. xxiv, 279.
- OSMITOPSIS ASFERICOIDES cont. borneol. xxviii, 474.
- OSMORRHIZA LONGISTYLIS, prop., Green. xxx, 209.
- PALM, adult. (up to 73 p. c. water), Cameron. xxi, 206, 483; xxiii, 522—account, Africa. xxiv, 741; xxviii, 105.
- PALMA ROSA, opalesc. alc. test, Hager. xxx, 320—(ginger grass). xxiii, 506.
- PARACOTO BARK, essential, Jobst and Hesse. xxviii, 213.
- PARAFFIN, act. upon metals (lead and zinc ought not to be used), McAdam. xxvi, 433—product of oxalic ac., Gallatly and Thomson. xxx, 379—production, Lemberger. xxiii, 627; xxiv, 271.
- PARSLEY, color react., Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 320—yield (France). xxvii, 381.
- PATCHOULY, adult. xxix, 143—account of product in India. xxix, 142—constitut. of stearopten, Gal. xix, 291—opalesc. alc. test, Hager. xxx, 320.
- PEANUT, is non-drying, non-rancid; consumpt. in France, Falières. xxii, 151—in India. xxiv, 723—Jamaica. xxiv, 732.
- PELARGON. ROSE, cont. borneol. xxviii, 474. See OIL GERANIUM.
- PENNYROYAL and glac. acet. ac., Barnes. xxiv, 321—color react., Kossow. xxvi, 434—drug market. xxi, 450; xxii, 642.
- , PEPPER, BLACK, color react., Kossow. xxvi, 434.
- PEPPERMINT and glac. acet. ac., Roucher. xxiii, 325; xxiv, 278; Barnes. xxiv, 321—adult. xix, 62, 336; xxi, 135, 219, 484; xxiii, 506; xxiv, 406; xxvi, 435; (herb distill. with oil rosemary), Schulze. xxii, 309—act. of sulph. ac. and bromine moderated by carbon bisulphide, Flückiger. xxii, 219—as a local anaesthetic, Wright. xix, 156—in burns and scalds. xxviii, 266—color react., Kossow. xxvi, 434; color react. with acet. ac., Roucher. xxiii, 325; xxiv, 278; with picric, sulph., mur., nitric acids, Frébault. xxiii, 323; Flückiger; Schack. xxx, 326—and CHLORAL HYDRAT, see under CHLORAL—constitution, Flückiger; Power. xxix, 288—contamin. with oil erigeron, Maisch. xviii, 277; oil erechites, Stearns. xviii, 277—drug market. xix, 399; xx, 126; xxi, 439; xxii, 638; xxv, 338, 350; xxvi, 658; xxvii, 560; xxx, 468—fluorescent with nitric ac., Flückiger. xix, 156—product. and yield. xxx, 172; in France. xxvii, 381, 3; Michigan. xxiv, 828; New York. xxx, 324—opalesc. alc. test, Hager. xxx, 320—iodine test deceptive, Calmberg. xxiii, 326—tests of purity, Flückiger. xxii, 219.
- PEPPERMINT fr. MENTHA AUSTRALIS;—M. GRACILIS;—M. GRANDIFLORA, Australia, yield. xxi, 219.
- PEPPERMINT, JAPANESE, analysis, Moss. xxiii, 322—solid, Mackay. xxiii, 323. See also MENTHOL.
- PETROMYZON FLUVIATILIS, Caspian Sea. xxvi, 331.
- PETROSELINUM, see OIL PARSLEY.
- PHOSPHORATED, Méhu. xxiv, 83. See also PHOSPHORUS.

Oil (OLEUM). (*Continued.*)

- PIMENTO, see OIL ALLSPICE.
- PINDAR = Arachis hypogæa, Jamaica. xxiv, 732.
- PINE CONE (abietis pini), Godeffroy. xxvi, 438; —PINE LEAF (Pinus sylvestris), Godeffroy. xxvi, 438.
- PINUS AUSTRIACUS. xxvi, 438.
- PINUS PUMILIO, color react., Kossow. xxvi, 434; xxv, 366.
- PINUS SYLVESTRIS, color react., Kossow. xxvi, 434—prop., Tilden. xxvi, 440.
- PISTACIA TEREBINTHUS, uses in Chios. xxix, 223.
- PITTOSPORUM UNDULATUM, Australia. xxi, 234.
- PLUMSEED, expressed, Guyot. xxv, 205.
- POPPYSEED, India. xxiv, 722, 5—bleached, Puscher. xxi, 345—blue react. with tinct. guaiac, Arnold. xxx, 452.
- PORPOISE, fr. Asia Minor. xxviii, 209—fr. Massachusetts. xxviii, 209.
- PORTUGAL, fr. flowers of Citrus aurant. (France). xxvii, 381.
- PORTUGAL PETIT GRAIN, fr. leaves of sweet orange (France). xxvii, 382.
- PROSTANTHERA LASIANTHOS;—P. ROTUNDIFOLIA, Tasmania. xxi, 221.
- PTYCHOTIS AJOWAN, cont. thymol, Stenhouse. xxvi, 441, 2.
- PULEGIUM, color react., Kossow. xxvi, 434.
- RADULA (= Pelargonium odorat.). xxiii, 506.
- RANUNCULUS, poisonous; relation to cantharidin, Basiner. xxx, 328.
- RAPESEED, refined, adult. xxi, 482—bleached, Puscher. xxi, 345.
- , "RED," = crude oleic acid. xxii, 461.
- RHODIUM and glac. acet. ac., Barnes. xxiv, 320.
- , ROCK-, = crude petroleum. xxi, 444.
- ROSE, adult. xix, 333; xxiv, 406—drug market. xxii, 639; xxiv, 397; xxv, 350; xxvi, 659; xxvii, 560; xxx, 468—product. xxi, 252; Turkey. xxiv, 830; Dupuis. xxii, 148; Locke. xxix, 289; France. xxiv, 823; xxvii, 382; India, Douglass. xxvi, 282—test for purity, Ganswindt. xxix, 289—opalesc. alc. test, Hager. xxx, 320.
- ROSE GERANIUM (fr. Pelargonium) and glac. acet. ac., Barnes. xxiv, 321—adult. xix, 268; xxiii, 506; detect., Jaillard. xxvi, 448—behav. to reagents, Jacobsen. xix, 268—cont. borneol. xxviii, 474—yield (France). xxvii, 380.
- ROSEMARY and glac. acet. ac., Barnes. xxiv, 321—adult. xxiii, 496—color react., Kossow. xxvi, 434—constitution, Bruylants. xxviii, 264—opalesc. alc. test, Hager. xxx, 320—yield (France). xxvii, 382—product. in Austria. xxii, 167—in Lesina, Cech. xxvii, 390.
- ROSIN, account. xxix, 235—act. of bromine, Allen. xxx, 314—detect. in linseed oil. xxiii, 503.
- ROSIA (fr. Anatherum andropogon). xxi, 253.
- RUE and glac. acet. ac., Barnes. xxiv, 321—synthesis, Gorup and Grimm. xix, 268—opalesc. alc. test, Hager. xxx, 320—yield (France). xxvii, 382.
- RUSCI = birch tar.
- RUSSICUM = birch tar.
- SAGE and glac. acet. ac., Barnes. xxiv, 321—constitut., Muir. xxvi, 445—opalesc. alc. test, Hager. xxx, 320—yield (France). xxvii, 382.
- SAMPAGNETA, Manila. xxiv, 767.
- SANDBOX (Hura crepitans), Jamaica. xxiv, 732.
- SANTALUM and glac. acet. ac., Barnes. xxiv, 321—adult. xix, 65, 484; xxii, 309; detect., Durand. xxvi, 448—constitut., Chapoteaut. xxx, 323—opalesc. alc. test, Hager. xxx, 320.
- SANTA MARIA NUTS (Calophyllum calaba), Jamaica. xxiv, 732.
- SANTONICA (LEVANT WORMSEED) cont. borneol. xxviii, 474—color react., Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 320—yield. Osse. xxiv, 276.
- SASSAFRAS and glac. acet. ac. xxiv, 321—adult. (rosin). xxiii, 506—constitut., Grimaux

Oil (OLEUM). (Continued.)

- and Ruothe. xviii, 272—drug market. xx, 126, 143; xxi, 440, 450; xxii, 635, 642; xxiv, 397; xxv, 350; xxvi, 658; xxvii, 560; xxx, 469—antidote to poison oak, Neeson. xxx, 246—opalesc. alc. test, Hager. xxx, 320—yield. xxi, 135.
- SAVIN and glac. acet. ac., Barnes. xxiv, 321—color react., Kossow. xxvi, 434—opalesc. alc. test, Hager. xxx, 320—yield (France). xxvii, 382.
- SAVORY, SUMMER (*Satureja montana*), prop., constitut., Haller. xxx, 323.
- SCOTCH FIR, see OIL PINUS SYLVESTRIS.
- SENECA, Pittsburg drug market. xxi, 444.
- SERPYLLUM (SERPOLET), color react., Kossow. xxvi, 434—constitution, Buri. xxvi, 441—yield (France). xxvii, 381.
- SESAMUM, detect. of adulterants. xxix, 304.
- SPEARMINT (*Mentha viridis*) and glac. acet. ac., Barnes. xxiv, 321—color react., Kossow. xxvi, 434.
- SPERM, test for purity, Gilmour. xxv, 280.
- SPICE BERRIES, see OIL BENZOIN ODORIFERUM.
- SPIKE, yield (France). xxvii, 381.
- SPIRÆA ULMARIA, probably ident. with oil wintergreen, Metzke. xxii, 217.
- SPRUCE, adult. xxiii, 495.
- STAR ANISE, behav. to reagents, Eyckman. xxix, 184—color react., Kossow. xxvi, 434—opal. alc. test, Hager. xxx, 319—yield, Osse. xxiv, 276.
- SWEET MARJORAM, see OIL MARJORAM.
- TANZY, constitution, Bruylants. xxvi, 448—opalesc. alc. test, Hager. xxx, 320.
- TARRAGON, yield (France). xxvii, 380.
- TEMPLIN, Godeffroy. xxvi, 438.
- THEOBROMA, see BUTTER CACAO.
- THEVETIA NERIIFOLIA (seeds), prop., Vrij. xxx, 182.
- THYME, adult. xxiii, 496—color react., Kossow. xxvi, 434—commercial (*origanum*) has thymol already extracted, Gerrard. xxvi, 441; Lemberger. xxx, 571—contains thymol, Neumann (1735). xxvi, 441, 2—opalesc. alc. test, Hager. xxx, 320.
- THYME, RED;—WHITE, yield, France. xxvii, 381.
- THYME, WILD, analysis, Feboe. xxx, 329.
- THYMUS SERPYLLUM, see OIL SERPYLLUM.
- TROPÆOLUM MAJUS, constitut., Hoffmann. xxii, 222.
- TURMERIC, FIXED, prop., Gajewsky. xix, 294.
- TURPENTINE, account, etc., Morel. xxvi, 326— and glac. acet. ac., Barnes. xxiv, 320; Lymons. xxiv, 321—ignites with chlorinated lime. xxiv, 277—act. of iodine, Armstrong. xxviii, 261; of pot. permanganate, Boettger. xxviii, 262; of sulphur. ac., Armstrong. xxviii, 261—antidote to phosphorus, Koehler and Schimpf. xxi, 281; (denied by Curie and Vigier. xviii, 293)—antiseptic (by forcing air through it), Kingzett. xxx, 321—cont. cymen, Wright. xxii, 217—decomp. at high temp., Schultze. xxvi, 440—dissolves hyposulph. sod. and loses its odor, Edison. xxvi, 378—emulsified, see EMULSION—yields iodoform, Hager. xxx, 346—for protecting the hands in *post mortems*, Foulis. xxix, 286—prop., Godeffroy. xxvi, 437—deodorized by tannin, Grüner. xix, 271—vivifying effect upon germination of seed. xxii, 168—purified by isinglass and salt. xxii, 213—opalesc. alc. test, Hager. xxx, 320.
- TURPENTINE: *Austrian*, fr. *Pinus austriaca*, Godeffroy. xxvi, 428—*Canada*, fr. *Pinus resinosa*. xxv, 338—*English*, fr. *Pinus palustris* and *P. taeda*, Godeffroy. xxvi, 438—*French*, fr. *Pinus maritima*, Godeffroy. xxvi, 438; color react., Kossow. xxvi, 434—*Georgia and Florida*, Zacharias. xxvi, 327—*German*, fr. *Pinus sylvestris*, Godeffroy. xxvi, 438—*North Carolina*, Wood. xxix, 235—*Russian*, fr. *Pinus sylvestris*, color react., Kossow. xxvi, 434; prop., Tilden. xxvi, 439—*Venice*, fr. *Larix decidua*, Godeffroy. xxvi, 438.
- VALERIAN, behav. to sulph. and nitric ac., Flückiger. xix, 155—cont. borneol. xxviii, 474—color react., Kossow. xxvi, 434—prop., Bruy-

Oil (OLEUM). (Continued.)

- lants. xxvii, 393—opalesc. alc. test, Hager. xxx, 320.
- VERBENA, adult. xxiii, 506—product. (France) xxvii, 382—opalesc. alc. test, Hager. xxx, 320.
- VETIVER, opalesc. alc. test, Hager. xxx, 320.
- VITRIOL, see ADID, SULPHURIC.
- , WALDWOLL-, see OIL, PINUS SYLVESTRIS LEAVES.
- WALNUT LEAVES, essential, Ender. xxviii, 265.
- WANGLO (sesamum), Jamaica. xxiv, 732.
- WHALE, California. xxvii, 633.
- WILD CHERRY KERNELS, Betz. xxvi, 500.
- WINE, HEAVY, constitut., Classen; Hartwig. xxviii, 275, 6—on the large scale, Hartwig. xxx, 344.
- WINTERGREEN, see OIL GAULTHERIA.
- , WOOD-, = Gurjun balsam; fr. *Hardwickia pinnata* and fr. *Aleurites cordata*. xxiv, 173.
- WOOD, see BALSAM GURJUN.
- WORMSEED (CHENOPODIUM), adult. xxiii, 506—Baltimore drug market. xxi, 449; xxii, 642—opalesc. alc. test, Hager. xxx, 320.
- WORMSEED, LEVANT., see OIL SANTONICA.
- WORMWOOD (absinthium) and glac. acet. ac., Barnes. xxiv, 321—constitut., Wright. xxiii, 332—opalesc. alc. test, Hager. xxx, 320.
- YHLANG-YHLANG, Manila, account. xix, 308—cont. benzoic ether, Flückiger. xxix, 191—prop. xxii, 127—opalesc. alc. test, Hager. xxx, 320.
- ZIERIA LANCEOLATA, Australia. xxi, 235.
- Ointments—lard substit. by expressed oil of mustard seed, Rother. xxiv, 65—with ceresin, Samphir. xxi, 155—smootheest by working cold, Wilder. xxiv, 66—in collapsible tubes, Harlingen. xxv, 61.
- BENZOATED (evaporate all alc. and strain), Wilder. xxii, 57—extempore (castor oil and benzoin), Bolton. xix, 150.
- BOXES, discussion. xxi, 78.
- CHINESE. xxii, 32.
- Ointment (UNGUENTUM).
- ACID, BORIC, Lister. xxv, 66; xxix, 63—Dana. xxx, 555.
- AC. CHRYSOPHANIC, Squire. xxv, 64.
- AC. SALICYLIC. xxiv, 66.
- ACONITIA OLEATE, Thompson. xxv, 416.
- ACRE (with cantharidin). xxx, 65.
- AQUA ROSA, see COLD CREAM.
- ATROPIA OLEATE, Thompson. xxv, 416.
- BURNS, Brown. xxv, 66.
- CAMPHOR. xxiv, 66.
- CANTHARIDIN. xxx, 65.
- CHIAN TURPENTINE, Janssen. xxix, 225.
- CHLORAL. xxv, 65.
- CHLORAL and VERATRIA, Fairthorne. xxiii, 47.
- CITRINE (HYDRARGYR. NITR.), discussion. xxix, 507—Baker (butter). xxix, 508—Evans (U. S. Ph. '60 best). xxiv, 67—Fairthorne (layer of glycerin). xxviii, 43—Falières (peanut oil). xxii, 58—Fredigke (temp. not higher than 190° F.). xix, 151—Gingerich (ox marrow and Rother's process). xxvi, 91—Hildarth (6-8 months old before using it). xxix, 508—Humerich (elaidin and beef suet). xxviii, 43—Llewellyn (cotton seed oil). xxix, 508—Lloyd (neatsfoot oil and red oxide mercury). xxviii, 42; (cod-liver oil). xxix, 509—Markoe (olive oil and lard). xxix, 508—Puy (neatsfoot oil and lard). xxx, 64—Rother (oxidizes fat). xix, 150—Sloan (lard oil and lard). xxix, 508—Starck (oxidized lard oil). xxviii, 43—Whall (beef suet). xxiii, 635; xxiv, 66—Wolff (oleic acid). xxv, 64.
- COPPER, BLACK OXIDE, for corns. xxi, 157.
- CUCUMBER, Procter, Jr. xxi, 601; xxii, 57—Sale. xix, 150.
- DIACHYLON, HEBRA (olive oil for linseed oil). xxv, 65—Deringer (soap, acet. lead). xxix, 63—Eisner (hydr. oxide lead, olive oil). xxx, 64—Hancock. xxii, 339—Popowski. xxx, 64.
- DIACHYLON, BALSAMIC, Hancock. xxii, 339.
- EMOLLIENT, Samphir. xxi, 155.
- CONTRA FAVUM CAPITIS, Hager. xxviii, 44.
- GALLÆ C. OPIO, Ph. Brit., real strength, Shuttleworth. xxiv, 181.
- GLYCERIN (with gelatin added), Katschinsky. xxx, 65.

- Ointment, HEBRA**, see OINTMENT DIACHYLON.
- **HOOF**. xxviii, 44.
- **HYDRARGYRI**, see OINTMENT, MERCURIAL.
- **HYDRARGYRI AMMONIAT.**, see OINTMENT, WHITE PRECIPITATE.
- **HYDRARGYRI NITRATIS**, see OINTMENT, CITRINE.
- **HYDRARGYRI OXIDI RUBRI**, see OINTMENT MERCURY, RED OXIDE.
- **IODOFORM**, DEODORIZED. xxviii, 44.
- **ITCH** ("aristocratic"). xxvii, 69.
- **LEAD OLEATE**, Gerrard. xxi, 157.
- **LEAD SUBACET.**, see OINTMENT, PLUMBI SUBACETATIS.
- **MERCURIAL**, adult. (charcoal). xxx, 624; (only 20 p. c.). xxii, 317; xxx, 551—discussion. xxx, 623, 5—examinat. of commercial, Kennedy. xxx, 551; Mutherbough. xxii, 317; xxiii, 45; Thein. xxx, 63—review. xxviii, 42—PREPARATION: (diastase). xxix, 62—(glycerin, acacia). xxx, 63—(glycerite starch). xxi, 155—Bayle (ether). xxiii, 45—Dannenberg (olein). xxv, 63—Dieterich (mercurial ointm.; need not be old). xxviii, 42—Fairthorne (mercury and chalk). xxviii, 41—Giraud (vegetable wax). xxvi, 91—Godeffroy and Weber (vaselin). xxviii, 42—Hager (chlorof., yolk of egg). xxi, 155—Hoglan (old ointment). xxvii, 69; xxx, 63—Magnes-Lahens (consistency). xxii, 58—Maisch (rancid ointment not necessary). xxx, 63—Painter (spatula and cold fat). xxx, 550—Remington (compd. tinct. benz.). xxix, 62—Wallet (divided portions). xxiv, 66.
- **MERCURY OLEATE**, Thompson. xxv, 415.
- **MERCURY and MORPHIA OLEATE**, Thompson. xxv, 417.
- **MERCURY, RED OXIDE**, prep.: Evans (oxide with oil). xxiv, 67—Hancock (castor oil, wax). xxii, 399—Kalisch (castor oil, wax). xxi, 155—Mansfeld (butter cacao). xxiii, 46—Martin (castor oil, wax). xxi, 154—Ullersperger (unsalted butter). xxi, 156.
- **MONNINIA**. xxvii, 218.
- **MORPHIA OLEATE**, Thompson. xxv, 417.
- **MYRISTICÆ OPIATUM**. xxv, 90.
- **PARAFFIN**, Lemberger. xxiii, 46, 628—Miller. xxii, 57.
- **PETROLEUM**, Sheppard. xxx, 58—best melting point, Rice. xxix, 430, 506—non-rancidity not absolute, Menninger. xxix, 506.
- **PILES**, Procter, Jr. xviii, 208.
- **PLUMBI OXIDI**, Philadelphia Hospital. xxiv, 67.
- **PLUMBI SUBACETATIS COMP.**, Ph. Brit., Squire. xxiv, 67.
- **POKE ROOT**, Hooper. xxv, 65.
- **POTASSIUM IODIDE**, Schacht. xxviii, 44.
- **QUINIA OLEATE**, Thompson. xxv, 416.
- **SAVIN**, Bateman. xix, 150.
- **SCALD HEAD**, Hager. xxviii, 44.
- **SIMPLE**, Neynaber. xxvii, 67.
- **SULPHUR IODIDE**, Ebert. xix, 150.
- **THYMOL** (dissolve in alc. first), Gerrard. xxvi, 443—Squire. xxvi, 90.
- **WHITE LEAD**, antiquity (130 B. C.). xxv, 476.
- **WHITE PRECIPITATE** (rub with oil first), Evans. xxiv, 67—(freshly made precipit.), Huber. xxv, 63.
- **ZINC OLEATE**, Gerrard. xxi, 157.
- **ZINC OXIDE**, Bolton (paint mill). xxi, 156—Diehl (olive oil). xxi, 156; (with flat iron). xxv, 62—Evans (oil). xxiv, 67—Fairthorne (glycerin). xxix, 63—Hancock (powd. benzoin). xxii, 339—Hogan (sift into melted lard). xxv, 63—Jester (sift into lard). xxii, 57—Kalish (oil almonds). xxi, 156—Köhler (calc. carbon. zinc one's self). xxvi, 91—Mansfeld (oil and wax). xxiii, 46—Run (water). xxv, 63.
- Ojo de gallo** = *Sanvitalia procumbens*, Mexico. xxiv, 774.
- Okina gusa** = *Anemone cernua*, Japan. xxviii, 163.
- Oldberg, Oscar**, improvements in the next pharmacopœia. xxi, 577—pharmacopœial nomenclature. xxviii, 383, 545.
- discussions: xxviii, 545, 547, 548.
- Oldenlandia GLOBOSA**, Liberia. descript., Holmes. xxvii, 182—*O. UMBELLATA*, Jamaica. xxiv, 736.
- Olea EUROPEA**. xxi, 215—cont. febrifuge principle in bark, Thibon. xxv, 138. See also OLIVE.
- Oleaceæ**. xxi, 215; xxii, 107; xxv, 138; xxvi, 208; xxviii, 125; xxix, 140; xxx, 168; of California. xix, 305; Kansas. xxix, 448.
- Oleander, YELLOW** = *Thevetia nereifolia*, India. xxx, 182.
- Oleandria**, Bitteli. xxiv, 368.
- Oleates**, discussion. xxv, 521—Wolff. xxvii, 429; xxx, 359.
- Olein, HYPOPHOSPHITE** = Artif. protagon of brain, Polk. xxv, 283.
- Oleomargarin**, sp. gr., Hager. xxvii, 424—as food. xxviii, 291.
- Oleo-palmitates**, Wolff. xxx, 359.
- Oleo-pardo** = *Myrocarpus fastigiatus*, South America. xxvii, 242.
- Oleo-resins**, benzin to be thoroughly investigated as a menstruum, Maisch. xxi, 338; Remington. xxi, 592; xxii, 536—drop equivalent, Talbot. xxix, 34.
- **IRIS VERSICOLOR**, Jenks. xxx, 152.
- Oleo-stearates**, Harlingen. xxii, 243.
- Oleo vermelho** = *Myroxylon peruiferum*, Brazil. xxvii, 242.
- Oleum**, see OIL.
- Olibanum fr. Boswellia Bhaudigiana**, India. xxiv, 718.
- behavior to reagents, Hirschsohn. xxvi, 453—9.
- Oliben**, Kurbatow. xxiii, 333.
- Olivastro**, variety of olive. xxi, 216.
- Olive, Asia Minor**. xxi, 217—Australia. xxx, 170—California. xxi, 215; xxv, 139; xxix, 140; xxx, 169—Greece. xxv, 139.
- statistics of varieties in Italy, Winter. xxi, 216—enormous size in Greece (2-2½ inch. in diameter). xxvi, 208—yield of fruit. xxv, 139—yield of oil. xxx, 170.
- **LEAVES** in fever, Greece. xxvi, 208—extract of leaves and immature fruit as substit. for quinia. xxvi, 582.
- **ETHIOPIAN**, of old writers, is *Boswellia Frereana*, Flückiger. xxvi, 296.
- Oliverin** in bark of olive tree, Thibon. xxv, 138.
- Olivetto** = *Teucrium fruticans*, Italy. xxviii, 128.
- Olivin**, intense light, Stein. xxiii, 113.
- Ollina gusa** = *Anemone cernua*, Japan. xxviii, 163.
- Omilja** = *Emblia officinarum*, Turkestan. xxi, 260.
- Omina-meshi** = *Patrinia scabiosæfolia*, Japan. xxviii, 150.
- Omphalocarpum PROCERA**, constituents of fruit, Naylor. xxx, 187.
- Omphalocarpia**, prop., Naylor. xxx, 187.
- Onage**, arrow poison of Gaboon. xxi, 222.
- Onagraceæ** of California. xix, 301; Kansas. xxix, 448.
- Onions**, uses in Greece. xxvii, 141.
- Onosma ECHINOIDES**, India. xxiv, 717.
- Ontario (Canada) pharmacy law**. xix, 354, 366; xxiii, 543.
- Oo-bei** = *Amygdala nana*, Japan. xxviii, 179.
- Oodasaliyun (Arab-Greek)** = *Apium graveolens*, India. xxvii, 192.
- Ooplates** = *Aplotaxis auriculata*, India. xxvi, 225.
- Ooroo tora** = *Cassia sophora*, Ceylon. xxvii, 474.
- Ooternee** = *Dæmia extensa*, India. xxv, 151.
- Ophelia CHIRAYTA**. xviii, 278. See also CHIRAYTA.
- **MULTIFLORA**, India. xxviii, 134.
- Ophioglossum VULGATUM**, p. c. of ashes, Church. xxiii, 126.
- Ophiopogon JAPONICUS**, Japan. xxiii, 130—descript., Holmes. xxviii, 204.
- Ophioxylon SERPENTINUM**, India, descript., Dymock. xxviii, 141.
- Ophthalmia**, paint (conc. tinct. cimicifuga), Close. xix, 488.
- Opianina**, history. xxi, 375—is ident. with narcotina, Hesse. xxiv, 347.
- Opium**, compare also POPPY—Scherzer's report. xxii, 628.
- contains free acet. ac., Brown. xxvi, 271—adult. of powd. xxi, 486; xxx, 576, 9 (powd. pil. opii with 20 p. c. soap.) xix, 337—adult. of lump

Opium. (Continued.)

- opium. xxi, 842, 485; xxii, 310; detect. of adult., Christison. xxiii, 507—mineral adult. of powd. detect. by chlorof. xxiii, 278.
- **ALKALOIDS**, Wright. xxiii, 390—homologous series, Hesse. xviii, 263, 4—influence of mould on alkaloidal strength, Bernbeck. xxx, 228—physiological act., Bouchut. xxi, 243; Ott. xxvi, 276—four physiolog. groups, Rabuteau. xxi, 243—reactions: Lindo (sulph. ac., ferric chlor.). xxvi, 559; How. xxvi, 560.
- antagonistic to belladonna, Abeille. xviii, 293—antidote (bisulph. carbon), Smith. xviii, 292.
- **ASSAY**, see also **MORPHIA**, **ESTIMATION**—discussion. xviii, 79—Alessandri. xxx, 231—Arnoldi. xxii, 143; xxiii, 203—Buri. xxiii, 201—Cleaver. xxvi, 272—Dragendorff. xxvi, 809—Flückiger. xxviii, 170—Geissler. xxix, 198—Hager-Jacobsen. xxii, 142; xxvi, 809, 810, 5, 8—Jacobsen. xviii, 264—Lynn. xxv, 191—Miller. xxi, 127—Mohr. xxvi, 809—Moss. xxiv, 180—Mylius. xxviii, 171; xxix, 198—Petit. xxvii, 222—Portes and Langlois. xxx, 232—Prescott. xxvi, 807, 822; xxix, 198—Procter, Jr. xviii, 79, 129; xix, 265—Procter-Staples. xxvi, 810, 6, 8—Proctor. xxvi, 274—Prollius. xxvi, 276—Schachtrupp. xxvi, 810, 820—Schlosser. xix, 266—Schneider. xxx, 232—Squibb. xxx, 229—Teschemacher. xxv, 299.
- **examinat. of commercial samples**, Dott. xxvi, 271—cultivat., hints. xxii, 628, 9, 630—drug-market. xix, 392; xx, 123; xxi, 438, 449; xxii, 626; xxiv, 396; xxv, 344; xxvi, 647; xxvii, 551, 560, 570, 579; xxviii, 374; xxix, 374; xxx, 470; in Smyrna and Constantinople. xxvi, 650—loss in drying. xxiii, 596—and its preparat. ought to be substit. by alkaloidal solut., Dott. xxvi, 292—importat. not permitted in Japan except to apothecaries. xxii, 142—restorat. of moisture, Vogeler. xxx, 229—cont. 20 p. c. water. xxi, 442—**MORPHIA** is not originally cont. in juice, Hesse. xxi, 243; p. c. is in inverse ratio to sulph. ac. in ash of plant, Scott. xxvii, 222; pale cont. more morphia than dark. xxii, 629; morphia strength, Squibb. xxx, 229, 230—preparations of Ph. Brit., errors in strength and doses, Shuttleworth. xxiv, 181—prices. xxii, 632—both a maximum and a minimum strength should be indicated. xxii, 144—about **STANDARDIZING**, and defining impurit. and hygroscop. quality, Proctor. xxvii, 220—trade in U. S., Fairthorne. xxix, 201.
- **Abkari provision**, assay. xxiii, 201, 2—**Adet**. xxii, 632—**Afium**. xxii, 631—**Africa** (Mozambique). xxvi, 270—**Algiers** xxii, 140—**American**, Ebert. xix, 103; discussion. xxii, 554; Wilson's. xxiv, 180; see the several States—**Asia Minor**. xxii, 139; districts. xxii, 630; cultivat., Scherzer. xxix, 196—**Australia** (7 p. c. morph., abnormal quant. of narcotina, 8 p. c.!!), Hood. xix, 265; descript. xxii, 140—**Austria** ("light brown" poppy best; 10 p. c.), Godeffroy. xxiii, 199—**Behar**, assay. xxiii, 201, 2; analysis of ash (23 p. c. sulph. ac.!!), Warden. xxvii, 221—**Bogaditsch**. xxii, 631—**California**, Maisch. xxii, 141—**Candeish**. xxiii, 201, 2—**China**, descript. xxii, 139; account (1 to 2 p. c.), Bateman. xxiii, 200; cultivat. xxvii, 218—**English**, assay. xxiii, 201, 2—**Egyptian**. xxii, 140; xxiii, 201, 2—**Germany** (13 p. c.), Jobst. xviii, 290; xix, 265; xxi, 240—**Gipp's Land**. xxiii, 200—**Himalaya**. xxii, 140; cultivat., Pogson. xxx, 227—**Hyderabad**, assay. xxiii, 201, 2—**India**. xxii, 139; cultivat. xxiii, 198, 9; xxiv, 726; distinct. test in cases of poisoning (presence of porphyroxin), Loll Dey. xxx, 228; assay. xxiii, 201, 2—**Karahissar**. xxii, 631—**Malwa**, assay. xxiii, 201, 2—**Michigan**, Remington. xxiv, 531, 691—**North Carolina** (5 p. c.). xxiii, 200—**New York**. xix, 103—**Pennsylvania** (8-9 p. c.), Kennedy. xix, 264—**Persian**. xxii, 139, 140; xxiii, 201, 2; assay, Howard (10 p. c.). xxiv, 179; (as low as ¼ p. c.), Proctor. xxiv, 179; production. xxviii, 172—**Patna garden**, assay. xxiii, 201, 2—**Provision** (for the Chinese market). xxiv, 731—**Russian** (Trans-Kaukasus). xxii, 139—**Silesia**. xxii, 140—**Sind**, assay. xxiii, 201, 2—

Opium. (Continued.)

- Smyrna** (as low as 7 p. c.), Starting. xxiv, 179—**South Carolina**. xxi, 242—**Spanish**. xxii, 141; cultivat. xxviii, 172—**Suffolk**. xxiii, 201, 2—**Swedish**. xxii, 141—**Tennessee**. xx, 87, 241; (10 p. c.). xxi, 242—**Turkestan** (7-8 p. c.). xxi, 242; assay, Hermuth. xxii, 141—**Vermont** (15 p. c.!!), Procter, Jr. xviii, 290; xxii, 554—**Wisconsin**. xxii, 555—**Württemberg** (12-15 p. c.), Jobst. xviii, 290; xix, 265; xxi, 240—**Yerli**. xxii, 631.
- Opium CURE**, Collins. xxi, 505—Beck. xxii, 321.
- **WAX** (on capsules of poppy), Hesse. xix, 264.
- Opodeldoc**, **LIQUID**, Barkhausen. (olive oil). xxi, 174; xxvii, 111.
- **SOLID**, Berg. xxviii, 66; Dieterich (dialysed soap). xxviii, 66.
- Opoponax**, adult. (myrrh). xxiii, 508—behav. to reagents, Hirschsohn. xxvi, 453-9.
- Opopycnoles**—extracts prepared by freezing, Herrera. xxvi, 95.
- Opuntia FICUS INDICA**, analysis of fruit, Popp. xix, 276.
- **NOPALILLO**, Mexico. xxiv, 775—**O. VULGARIS**, Kansas. xxix, 440.
- Orange**, yield of citric acid, Wehrli. xxvi, 547—kept fresh (in dry sand in cool cellar), Landerer. xxvii, 64—in Australia. xxviii, 100—California. xxvii, 633—Louisiana (fr. seed). xxvii, 210.
- **FLOWERS**, lose all odor in sunlight, Rush. xxvii, 211.
- **JUICE**, act. of iod. ac. and starch; sulphomolybdic ac.; ferric chlor., Brown. xxvii, 485, 6.
- **PERL**, adult. of powd. xxx, 576—act. of sulph. ac. and alc., Doliber. xix, 444—active constituents, Stabler. xxii, 391; xxiii, 195—kept fresh and free fr. mould (in alc. vapor), Stabler. xxi, 76.
- **PETALS**, yield of glucose and saccharose, Bous-singault. xxvii, 514.
- Orange brown**, **THALLIUM**-, Salter. xxvi, 423.
- **POIRRIER'S III**—methyl-orange. xxx, 442.
- Orange Free State**, drugs, Centen. exhibit. xxiv, 743.
- Orange grass**—*Hypericum sarothra*, Kansas. xxix, 445.
- Orchidaceæ**. xxiii, 137; xxiv, 127; xxix, 130; of California. xix, 307; Mexico. xxiv, 769.
- Orchil**. See **ARCHIL**.
- Ordeal poison** of Gaboon (alkaloid differs fr. strychnia and brucia, and is quickly eliminated), Rabuteau and Peyre. xix, 286.
- Oregon grape**—*Berberis aquifolium* and *B. repens*, California. xxvi, 698; xxvii, 606.
- See also **B. AQUIFOLIUM**.
- Oreja de agua**, Arg. Republ. xxiv, 765—**O. DE GATO**, Arg. Republ. xxiv, 762, 4.
- Oreodaphne CALIFORNICA**. xix, 305—account, xxvii, 284, 601—analysis of oil, Heamy. xxiii, 145.
- Oreodaphnol**, Heamy. xxiii, 145, 334, 5.
- Organic BODIES**, **ARTIFICIAL**—Pasteur's statement, about their inact. on polarized light, disproved, Jungfleisch. xxi, 362.
- **MATTER**, act. of ozone, Houzeau. xxi, 271.
- Orgibão**—*Stachytarpheta Jamaicensis*, Brazil. xxvii, 163.
- Origanum HIRTUM**, essent. oil, Jahns. xxviii, 265.
- **MARU**, Chili. xxiv, 766.
- Oro ami**—*Patrinia scabiosæfolia*, Japan. xxviii, 150.
- Orobanche CARYOPHYLLACEA** and **GRANDIFLORA**, weed in Greece, Landerer. xxvi, 202.
- Orobanchaceæ**. xxvi, 202; xxvii, 156.
- Orozú**, Arg. Republ. xxiv, 763.
- Orris root**, adult. of powd. xxi, 486; xxx, 576—dug by night is phosphorescent, Landerer. xxi, 209—essent. oil. See **OIL ORRIS**—Italy, fr. *Iris florentina*, - *germanica*, - *pallida*. xxi, 209.
- **INDIA**—*Apilotaxis auriculata*. xxvi, 225.
- Orseille**, adult. with anilin refuse, Hock. xxiii, 125.
- Ortho-oxy-benzoyl-tropeïn**—*Salicyl-tropeïn*, Ladenburg. xxix, 337; xxx, 424.
- Orynski**, L., syrups without heat. xix, 451.
- Osage orange**—*Maclura aurantiaca*, Texas. xxi, 261.
- Osann**, G., milk sugar. xxix, 437.

Osbeckia ROTUNDIFOLIA, Liberia, description, Holmes. xxvii, 237.
Osborne, H. xx, 98, 99, 100.
Osha ROOT, Mexico, Haupt, Jr. xxii, 125.
Osmitopsis ASTERICOIDES, oil cont. borneol. xxviii, 474.
Osmium. xix, 211; xxiii, 317; xxiv, 267.
 — prop., Deville and Debray. xxiv, 267—behav. to oxygen, Deville. xxvii, 374—poisonous prop., Deville. xxiii, 317.
 — AMIDE to replace perosmic acid for histolog. researches, Owsjannikow. xix, 211.
Osmorrhiza BERTERI, Chili. xxiv, 765.
 — BREVISTYLIS substitut. for *O. longistylis*. xxiii, 501.
 — LONGISTYLIS, constituents of root, Green. xxx, 209;—*O. NUDA*;—*O. OCCIDENTALIS*, California. xix, 302.
Osmosis. See DIALYSIS.
Ossa sepia, account and uses, Wiegand. xxiii, 233.
Ostruthin, prep., prop., Gorup-Besanez. xxiii, 453.
Ostrya VIRGINICA, Kansas. xxix, 444.
Otolithus MACULATUS, China. xxii, 172.
Otto. See OIL.
Ottonia ANISUM;—*O. JABORANDI*, Brazil. xxiv, 160.
Ouaraye=*Chrysobalanus icaco*, Africa. xxix, 116.
Ouplate=*Aplotaxis costus*, India. xxvi, 161.
Ourari=*curare*=*Strychnos Crevauxii*. Guiana. xxix, 150.
Owa=*Coleus aromaticus*, India. xxv, 143.
Owala=*Pentaclethra macrophylla*, Africa. xxix, 116.
Oxalis ACETOSELLA, inspissated juice as cautery, Eltinge. xxx, 214.
 — CORNICULATA;—*O. OREGANA*, California. xix, 300;—*O. VIOLACEA*, Kansas. xxix, 445.
Oxanilin as test for carbol. ac., Klunge. xxx, 353.
Oxethen anilin, Dernolet. xxii, 274.
Oxides, METALLIC, temp. of reduct. by hydrogen, Müller. xix, 138.
Oxidizing substances, TEST PAPER, Mohr. xxii, 51.
Oxyacanthin in *Berberis aquifolium*. xxx, 213—berberin and hydrastin comparat. behav. to reagents, Parsons. xxx, 434.
Oxybenzoyl-tropein, Ladenburg. xxix, 337; xxx, 424.
Oxycannabin, prop., Bolas and Francis. xix, 291.
Oxycolophthalin, prop., Curie. xxiii, 320.
Oxydimorphia, Polstorff. xxviii, 322.
Oxygen. xviii, 215; xix, 176; xxi, 269; xxiii, 237; xxv, 239; xxvi, 332; xxvii, 290; xxviii, 212; xxix, 239; xxx, 255.
 — absorpt. by copper in presence of ammon. and carbon. ammon., Hempel. xxx, 257—development by act. of nasc. hydrogen, Hoppe-Seiler. xxviii, 212—estimat. xxi, 269; in urine, Freire. xxiv, 391—LIQUEFACTION, Pictet. xxvi, 42; 332—nascent liberates iodine fr. pot. iodide, Kingzett. xxi, 272—MANUFACT. ON THE LARGE SCALE. xviii, 215; xxx, 255, 257—PREPARATION: (peroxide barium), Brin. xxx, 257; (manganate calc.), Delaurier. xviii, 215; xix, 176; (baryta, mang. pot.), Gondolo. xviii, 215; (chlorate pot., peroxide mangan.), Martenson. xxi, 270; (subchloride copper), Phillips. xviii, 216; (chlorinated lime). xxx, 255; (pot. permang., sulph. ac.). xxii, 196; (nitric ac. and a peroxide). Boettger. xviii, 215—precautions in preparation, Limousin. xxix, 239.
 — ACTIVE, Traube. xxx, 257.
Oxyleucotin in para-coto bark, Jobst and Hesse. xxviii, 202.
Oxylobium, poisonous. xxviii, 347.
Oxymorphia, physiolog. act., Ott. xxvi, 277—of Schützenberger is ident. with oxydimorphia of Polstorff and Brookman. xxviii, 322.
Oxynarcotina, constitut., Wright and Beckett. xxvi, 564.
Oxyneurin of Liebreich ident. with betain of Scheibler and lycina of Husemann. xxiii, 427; xxvi, 611.
Oxytropis COMPESTRIS, California. xxvii, 611;—*O. LAMBERTI*, Colorado, analysis of root, Watson. xxvii, 246.
Oxytoluol-tropein=*homatropin*, Ladenburg. xxviii, 321; xxix, 337; xxx, 424.

Oyametl=*Pinus religiosa*, Mexico. xxiv, 770.
Oysters, poisonous prop. at certain seasons due to ptomaines, Schlagdenhauffen. xxx, 442.
Oyster shell, prepared, adult. xxiii, 509.
Ozokerite (-CHRITE), Galicia. xxi, 319—account. xxiv, 795—sp. gr., Dieterich. xxx, 363—in Utah, Newberry. xxvii, 378.
Ozone act. upon several substances, Houzeau xxi, 271; Mailfert. xxx, 258—apparatus (cold air through flame). xxi, 272—its bleaching power, Baillot. xxiii, 238—explodes, nitroglycerine, dynamite, etc., Jouglot. xix, 176—found over protosulph. iron, Johansen. xxix, 263—formed during slow oxidat. of phosphorus, McLeod. xxviii, 213—found in milk. xxx, 452—developed by plants and flowers in sunlight (those destitute of odor do not produce ozone), Mantegazza. xix, 176—color and LIQUEFACTION, Hautefeuille and Chappuis. xxix, 240; xxx, 258—preparat., Soret's method (electrolysis of dil. sulph. ac.), Carius. xxi, 272—is not stable, Berthelot. xxvii, 290; keeps when dissolved in aqueous solut. of oxal. ac., Jeremin. xxvii, 290—soluble in water, Leeds. xxviii, 213—iod. pot. and starch test is not very delicate, Giannetti xxiii, 237.
 — POWDER, Lender. xxv, 239.
Ozonizer (galvanic), Houzeau. xxi, 271.

P.

Pachak=*Aplotaxis auriculata*, India. xxvi, 225.
Pachyma cocos, offered in London as China root. xxi, 204, 8.
Pack balls, fr. *Quercus densiflora*, California. xxvi, 698.
Packing, I. Rubber, steam- and air-tight (apply shellac in ammonia). xxx, 48.
Pads to stand glass vessels on (roofing felt), Townsend. xxvi, 80.
Paeonia-crystalline fr. *Paeonia peregrina*, Dragendorff. xxvii, 198.
 — ALBIFLORA China. xxiv, 745.
 — PEREGRINA. xxviii, 161—analysis of seed and root, Dragendorff and Mandelin. xxvii, 196.
 — MOUTAN, China. xxiv, 747—analysis, Jagi. xxvii, 198—in Japan, descript., Holmes. xxviii, 164.
Pagala mullai=*Nyctanthes arbor tristis*, India. xxviii, 126.
Pago, Arg. Republ. xxiv, 764.
Pah-gump-pea-abbah=*manna* fr. *Arundo phragmites*, Utah. xxvii, 137.
Pahnet-snap=*Ligusticum apiifolium*, Utah. xxvii, 193.
Paico, Arg. Republ. xxiv, 762, 4—=*Ambrina ambrosioides*, Chili. xxiv, 765.
Painter, Emlyn, mercurial ointment. xxx, 350—report on adulterations. xxv, 352.
 — discussions. xxv, 665, 682.
Paints, California. xxvii, 634.
 — without turpentine or linseed oil (rosin, soda, am.), Theis. xxviii, 97.
Pakhánbed=European gentian and a species of *Iris*, India. xxviii, 134.
Pakoe-kidang=*Aspidium Barometz*, Malacca. xxii, 98.
Palan-palan, Arg. Republ. xxiv, 764.
Palladium. xxi, 318; xxiii, 315; xxiv, 267; xxvi, 427.
 — absorbs hydrogen, Graham. xviii, 217; Troost and Hautefeuille. xxiii, 315—behav. to oxygen, Deville and Debray. xxvii, 374—elasticity, Geschus. xxvi, 427—pure, Schneider and Wilson. xxix, 218—salts, act. of trimethylamine, Vincent. xxv, 316.
 — AMMONIO-CHLORIDE, Deville and Debray. xxvi, 427.
 — CHLORIDE, act. of ozone, Mailfert. xxx, 259—reduced by formate of sod., Boettger. xxi, 318.
 — NITRATE, act. of ozone, Mailfert. xxx, 259.
 — and SODIUM SULPHITE, Wöhler. xxiii, 315.
 — SULPHO-CYANIDE, Kern. xxiv, 267.
Pallet FOR TESTS (the flat part black), Dupour and Rouaix. xxviii, 287.
Palm sugar, analysis, Horsin-Déon. xxix, 309.
Palmaceæ. xix, 296; xxi, 206; xxiii, 126; xxiv, 122; xxv, 124; xxvi, 183; xxvii, 138; xxviii, 105.

- Palmeira de azeite**—*Elais guineensis*, Africa. xxviii, 105.
- Palmella CRUENTA**, coloring matter resembles hæmaglobin, Phipson. xxviii, 355.
- Palmellin fr.** *Palmella cruenta*. xxviii, 355.
- Palmitas**—*Polypodium pseudo-filix mas*, Mexico. xxiv, 769.
- Palo de la cruz**, Arg. Republ. xxiv, 764.
- Palo dulce**—*Eysenhardtia amorphoides*, Mexico. xxiv, 776.
- Palo del muerto**—*Ipomœa murocoides*, Mexico. xxiv, 772.
- Palo mulato**—*Xanthoxylum pentanome*, Mexico. xxiv, 777.
- Palo de velas**—a spec. of *Parmentiera*, Mexico. xxvii, 156.
- Palpalen**—*Senecio cymosus*, Chili. xxiv, 765.
- Palqui**, Arg. Republ. xxiv, 762—*Cestrum parqui*, Chili. xxiv, 765.
- Paltochina**, alkaloid fr. *Cinchona palton*, Howard. xxiii, 402.
- Panchontee**—*Bassia elliptica*. xxiv, 719.
- Pancration** (of Pythagoras) = *Asphodelus racemosus*. xxiv, 123.
- Pancratium MARITIMUM**. xxiv, 124.
- Pancreas**, glycerin extract, Poster. xix, 234.
- Pancreatic juice**, cont. myopsin, amylopsin, steapsin, Desfresne. xxvii, 545.
- views of Lehmann, Claude-Bernard, Valentine, etc. xxiv, 602—yield and act. of microzyme, Béchamp. xxix, 368—chem. compd. with albumen, Wittich. xxiii, 468—quality of commercial, Moriarta. xxx, 460—(of Mattison) is chiefly pepton, Scheffer. xxiii, 729—is destroyed in the stomach, Scheffer. xxiv, 391—incompatible with pepsin, Scheffer. xxiii, 713—prep., prop., Scheffer. xxiv, 551—prep., Hamen. xxiii, 469; Mattison. xxii, 289; Phar. Soc. Paris. xxvi, 632.
- Pancreasymase**, Béchamp. xxix, 368.
- Pandrook**—gum of *Sterculia urens*, India. xxvi, 161.
- Panicum CRUS GALLI**, Utah. xxvii, 137.
- **MILIARE**, seeds found in Baltic linseed, Holmes. xxx, 215.
- Panus TORULORUS** cont. oxalic ac., Hamlet and Plowright. xxvi, 178.
- Pao-Paireira**—*Geissospermum læve*, Brazil. xxvi, 217.
- Papa purgante**, Arg. Republ. xxiv, 764.
- Papaïn**, see PAPAYOTIN.
- Papaver**, see also POPPY.
- **RHÆAS**, juice contains no morphia but rhœadin, Hesse. xxv, 193—in India, account, Dymock. xxvi, 162.
- **SOMNIFERUM**, uses in Malta. xxvi, 167.
- Paperveraceæ**. xviii, 290; xix, 264; xxi, 240; xxii, 139; xxiii, 198; xxiv, 179; xxv, 191; xxvi, 270; xxvii, 218; xxviii, 170; xxix, 196; xxx, 227; of California. xix, 299; Kansas. xxix, 448.
- , **ALKALOIDS**, literature and history, Ludwig. xxi, 372, 4.
- Papaverina**, behav. to sulph. ac. and ferric chlor., How. xxvi, 560; to arseniate sod, Tattersall. xxviii, 324, 5—microsublimating point, Blyth. xxvii, 483—physiolog. act., Ott. xxvi, 277.
- Papaw**, see also PAPAYOTIN.
- act. on starch, Rose. xxix, 367; on meat, Chapoteaut. xxix, 365—drugmarket, xxix, 371.
- Papayaceæ**. xxiii, 205; xxvii, 231.
- Papayotin**. xxix, 374—digestive act., Geissler; Eulenburg. xxx, 456—acts upon milk without acid, Wurtz; Bouchut. xxviii, 175, 6—agrees closely in act. with trypsin, Wurtz. xxix, 367—prop., Wurtz. xxix, 366—strength of pure. xxx, 473.
- Paper**, see also CHARTA.
- **ALKANET**. xix, 141; xxx, 67—**BLISTERING**, Limousin. xxx, 66—**CALABARIZED**, Kennedy. xxiii, 604—**CAPPING**, arsenical, Barnes. xxvi, 89—**CHECK**, SAFETY, Heckmann. xxx, 132—**FERROCYANIDE POTASSIUM**, Mohr. xxii, 51—**FILTERING**, see **FILTERING PAPER—FIREPROOF**. xxvii, 121—**FUMIGATING**, Boutigny. xxvi, 134; Wilder. xxiv, 68—**GOUT**, transparent. xxvi, 92—fr. **HOP-STEMS**. xix, 293—**INCOMBUSTIBLE**. xxix, 110—**IODATE POTASSIUM**, Mohr. xxii, 51.
- Paper**, **LITMUS**, delicacy as reagent, Bullock. xxi, 140; method of using, Lawler. xxiii, 109; prep., Mohr. xxii, 50; Squibb. xix, 515; Warrington. xxiv, 328—**LOGWOOD**, preferable to litmus, Krätzer. xxx, 66.
- **MUSTARD** (oil must be previously extracted). xxv, 66—(caoutchouc in benzin, bisulph. carb.), Pharm. Soc. Paris. xxvi, 92.
- **NITRE**, Murrell. xxx, 66—**OILED**, as substit. for oiled silk, Thorey. xxiii, 48—**PARAFFIN**, Shinn. xxv, 563.
- **PARCHMENT**, history and uses. xxvi, 503; prep. xxvi, 504—fr. **POPLAR WOOD**, manuf. at Holyoke, Mass. xxviii, 295—**RHUBARB**, Lacour. xxviii, 38—**SPONGE**, Gustin. xix, 171—**STYPTIC**. xix, 166—**SULPHOCYANIDE POTASSIUM**, Mohr. xxii, 51.
- , **TEST**, see **TEST PAPER—TRANSPARENT**. xxii, 52—**TURMERIC**, Mohr. xxii, 50—**VARNISH**. xix, 174—**VARNISHED**, Thorey, xxiii, 48—**WATER-PROOF** (ammonio-sulph. copper), Böttger. xxiii, 48; Scoffern. xix, 171.
- , **WAX**. xix, 70; xxviii, 92.
- in California. xxvii, 634.
- lint, Keen. xxvi, 157.
- Papers**, about rejection of unsuited, Diehl. xxiii, 750. See also PUBLICATION.
- Papilla**, Arg. Republ. xxiv, 761.
- Paprika**—Hungarian red pepper. xxix, 139.
- Paptee che mul**—*Pavetta indica*, India. xxv, 162.
- Papyrus Ebers**, history, Rice. xxiv, 26.
- Paracelsus**. xxv, 478.
- Paraconia** (of Schiff) is artificial conia. xxi, 384—fr. butylden chloride, Michael and Gundelach. xxx, 439.
- Para coto bark**. xxv, 232—analysis, Jobst and Hesse. xxviii, 200.
- Paracotoïn**, Jobst. xxv, 28, 232—Jobst and Hesse. xxviii, 202.
- Paracresol**. xxii, 254.
- Paradigitaletin**—digitalretin, Walz. xxiii, 443, 743.
- Paradigitogenin**, Schmiedeberg. xxiii, 444, 446.
- Paradisol**, Buchheim. xxii, 101.
- Paraffin**, act. of heat, Bolley. xviii, 273; of nitric ac., Pouchet. xxiii, 318—amorphous and crystalline, Sheppard. xxx, 59—detect in beeswax, Buchner; Wagner. xxvii, 435—for frescoes; wine-casks, Vohl. xxi, 144—manuf. and purification, Miller. xxii, 209—purified, Hächt. xxx, 315—sp. gr., Dieterich. xxx, 363—its USES, Babcock. xxiii, 632, 797; Falke. xxiii, 633; Lemberger. xxiii, 46; xxvi, 271; Miller. xxiii, 46; Stacey. xxiii, 629; xxiv, 270—object. to its use as stopper and cement for alkaline liquids, Glässner. xxi, 319—quality improved, xxx, 315.
- **BLOCKS**, PERFUMED, Chiris, xxiv, 824.
- **OIL**. See **OIL, PARAFFIN**.
- Para grass**—*Spilanthes oleracea*. xxi, 225.
- Paralbumin**, detect. and prop., Vulpius. xxix, 359.
- Para-methyl-propyl-benzene**. xxvi, 445.
- Paramignya MONOPHYLLA**, India. descript., Dymock. xxvi, 159.
- Paramylan**, fr. *Fucus amylaceus*, Greenish. xxx, 140.
- Para-oxy-benzoyl-tropeïn**, Ladenburg. xxix, 337; xxx, 424.
- Para-peptone**, Adamkiewicz. xxvi, 633.
- Pararabin** in sugar-beet root, Scheibler. xxiv, 314.
- Parchment paper**. See **PAPER, PARCHMENT**.
- Paireira**. See also **CHONDODENDRON TOMENTOSUM**.
- adult. (stem), Moss. xxii, 310; of powd. xxx, 576—root is seldom seen, usually the stem, Maisch. xix, 113; Squibb. xix, 500—when introduced xxvi, 448—contains dyamettin, Flückiger. xviii, 288—origin disputed. xviii, 288—true source, Hanbury. xxii, 128.
- , **FALSE**, Brazil, Morrison. xxvii, 206.
- Parham, Robert**. xix, 111.
- Paricina**, history, Hesse. xxiii, 403—in cinchona succirubra (Darjeeling), Hesse. xxvi, 568—and aricina, Howard. xxvii, 497, note.
- Parietaria OFFICINALIS**, ancient synonyms, Landerer. xxv, 122—**P. PENNSYLVANICA**, Kansas. xxix, 452.
- Parigenin** fr. parillin, Flückiger. xxvi, 612.

- Parillin** (fr. sarsaparilla), history, prep., prop., Flückiger. xxvi, 611.
- Paris du Maharão** = *Cocculus toxiferus*, Brazil. xxvi, 216.
- Parlia PERLATA**, India. xxiv, 718.
- Parlieria HYGROMETRICA**, Chili. xxiv, 766.
- Parmelia CRUENTA**, cont. characin, Phipson. xxviii, 268—*P. KAMTSCHADALIS*, India. xxiv, 718—*P. SCRUPOSA* cont. patellaric ac., Wiegelt. xix, 263.
- Parmentiera EDULIS**, Mexico. xxvii, 157.
- Parmethyl-propyl-benzene**, synthesis, Fittica. xxiv, 269.
- Paronychia ARGENTRA**;—*P. NIVEA*, Algiers, account, Jackson. xxvi, 278.
- Paronychaceae**. xxiii, 205; xxvi, 278.
- Parrish, Clemens**, rennet and pepsin. xix, 511.
- Parrish, Edward**, preliminary education of apprentices. xx, 173—*Ferris Bringham*. xix, 42—keeping herbs. xix, 123—*E. L. Massot*. xix, 42—pharmaceutical education. xix, 33—portrait. xxiii—*W. Taylor*. xix, 42.
- discussions: xix, 26, 31, 32, 33, 42, 66, 68, 69, 70, 75, 76, 87, 88, 89, 90, 91, 92, 93, 94, 100, 104, 105, 106, 109, 114, 115, 117, 118, 119, 120, 123, 124, 125.
- Parosip, WILD**—*Sium latifolium*, is poisonous. xxv, 168.
- Parsons, Henry B.**, solubilities. xxx, 621.
- discussions: xxx, 621.
- Parts by weight for absolute quantities**, Sharples. xxiv, 453; xxv, 519—discussion. xxiv, 677; xxv, 519.
- Partak**=*Nyctanthes arbor tristis*, India. xxviii, 126.
- Parthenion**=*Parietaria officinalis*, Landerer. xxv, 122.
- Parthenium HYSTEROPHORUS**, Mauritius. xxiv, 741.
- *INTEGRIFOLIUM*, therapeutic value and constituents, Meyer. xxx, 194.
- Passiflora DICTAMUS**, Mexico. xxiv, 775.
- Passifloreneae**. xxviii, 174—Mexico. xxiv, 775.
- Pasta GUMMOSA** (without heat), Sarrazin, xxv, 67.
- Paste**, see also CEMENTS; MUCILAGE.
- casein, borax. xix, 173; xxiii, 114—flour, nitric ac. xxx, 136; nitro muriat. ac. xix, 173—glue, starch. xxii, 52—fr. horse chestnut starch is insect proof. xxvii, 279—for hot places (cont. glyc.). xxiii, 50; xxviii, 33—cont. alum, rosin. xviii, 212—tragacanth, sassafras. xxviii, 40—tragac., acac., carbol. ac. xxvii, 61—preserved by silicate sod. xxvii, 62.
- for PAPER ON TIN, add butter antimony. xxvi, 89—(four methods). xxx, 57.
- CAUSTIC, MICHEL (sulph. ac. and asbestos). xxvii, 76 See also CAUSTICS.
- PHOSPHORUS, see PHOSPHORUS PASTE.
- , PRUNES, Fairthorne. xxx, 126.
- Pastilles, ASTHMA**, Hustwick. xxi, 175.
- *BELLADONNA*;—*CINNABAR*. xxx, 131;—*COFFEE* (fumigating), Close. xix, 490; xxi, 175.
- *DIGESTIVES de BORIVENT*. xxv, 114.
- *DIGITALIS*;—*IODINE*;—*IODINE AND SULPHUR*;—*MOSQUITO*;—*OPIUM*. xxx, 131.
- *QUINIA TANNATE* (tasteless), Roznyay. xxiv, 109.
- *SENNA*, Batilliat. xxii, 77.
- *STRAMONIUM*;—*TAR*;—*TOLU*. xxx, 131.
- Pastinaca GRANDIS**, India, descript. Dymock. xxvii, 194.
- *SATIVA*, Kansas. xxix, 452—analysis, Gutzeit. xxviii, 160—fruit, cont. ethylic alcohol, Gutzeit. xxiv, 287.
- Pasto MELOSO**, Arg. Republ. xxiv, 762.
- *NATURAL DE LA SIERRA*, Arg. Republ. xxiv, 762.
- Patalagandhi**=*Ophioxylon serpentinum*, India. xxviii, 141.
- Patch, Edgar L.** Gentian and iron reaction due to gentisic acid. xxix, 457—gentiopicrin. xxx, 568.
- Patchouli**, microscop. characters, Paschkis. xxix, 143—cultivat., distill. of oil, Sawyer. xxix, 142.
- Patellaria SCRUPOSA**, analysis, Wiegelt. xix, 263.
- Patented articles not to be mentioned**, discussion. xxii, 565—apparatus, yes. xxii, 572.
- Patent medicines and trade marks**. xxx, 641. See also PROPRIETARY.
- Pato de gallinazo**=*Cinchona coccinea*. xxx, 197.
- Patrinia SCABIOSÆPOLIA**, Japan. xxviii, 100—descript., Holmes. xxviii, 150.
- Patten, J. Bartlett**, "apothecary." xxii, 343.
- Pau santo**=*Tecoma ipé*, Brazil. xxii, 115.
- Paullinia PINNATA**, Brazil, analysis of rootbark, Martin. xxv, 191—descript. of bark. xxv, 189.
- *SORBILIS*. See GUARANA.
- Pava-kai** fruit of *Momordica charantia*, India. xxvii, 228.
- Pavetta INDICA**, India, descript., Dymock. xxv, 162.
- Pavonia WELDENII**, India. xxix, 148.
- Pawpaw**. See PAPAW.
- Payta BARK** is from an *aspidosperma*, Hesse. xxx, 185.
- Paytamina**, Hesse. xxvi, 569.
- Paytina**, history, Hesse. xxiii, 404—prop., Hesse. xix, 279, 282; xxvi, 568.
- Pea, EVERLASTING**, amount of sugar in nectar, Wilson. xxvii, 442.
- Peach BARK**, constituents, McCrea. xxii, 147.
- *GUM*=*Eucalyptus persicifolia*, Australia. xxiv, 806.
- *KERNELS*, yield of amygdalin. xxiii, 437.
- Peanut**, constituents, Flückiger. xviii, 285.
- Pearlash**, yield fr. *Eucalyptus spec.*, Adams. xxvii, 234. See also POTASSIUM CARBONATE.
- Peat**, for leeches, Vogeler. xxx, 253.
- Pébrine**, disease of silkworm, Pasteur. xix, 314.
- Pecan**=*Carya olivaeformis*, Kansas. xxix, 446.
- Pech, SCHIFF**;—*SCHUSTER*;—*SCHWARZES*, pitch. xxvi, 325.
- PedaliuM MUREX**, India, descript., Dymock. xxv, 146.
- Pedicularis CANADENSIS**, Kansas. xxix, 451.
- Pediculus MELITTÆ**. xxiv, 511.
- Pe-fa-lie**=*"China root"* (fungus on fir trees). xxi, 501.
- Peganum HARMALA**, India, descript., Dymock. xxvi, 160.
- Peh-pu**=*Roxburghia sessilifolia*, China. xxviii, 110.
- Pei-mu**=*Fritillaria Thunbergii*, China. xxviii, 110.
- Peixotto, M. L. M.** xix, 76, 77, 94; xxi, 61, 73, 74; xxii, 502, 505, 532, 533, 534, 560; xxiv, 669; xxv, 538.
- Pelargonium ODORATISSIMUM**. See OIL ROSE-GERANIUM.
- Pelletierina**, prop., Tanret. xxvi, 280; xxvii, 517; xxviii, 341.
- *SULPHATE*, vermifuge prop., Ferand. xxviii, 342.
- *TANNATE*, vermifuge prop., Ferand. xxviii, 342, 374; xxx, 473.
- Pellitory**=*Parietaria pennsylvanica*, Kansas. xxix, 452.
- root (*PYRETHRUM*), irritant prop. denied, Close. xxvi, 229.
- Pelosina** fr. pareira, identical with bebeerin and buxin, Flückiger. xviii, 288—as subst. for quinia, Husemann. xxvi, 581.
- Penachillo**, Arg. Republ. xxiv, 764.
- Penacho**, Arg. Republ. xxiv, 762—*P. TINCTORIAL*, Arg. Republ. xxiv, 762.
- Pencils**, see also CAUSTICS.
- *BALS. PERU*;—*BELLADONNA* and *OPIUM*, Legras. xxviii, 49—*CHARCOAL* for cutting glass. xxix, 54—*COPPER SULPHATE*, Primke. xxvii, 76—Weber. xxvii, 75—*COPYING*, Viedt. xxiv, 113—*CORROSIVE SUBLIMATE*, Legras. xxviii, 49;—*CROTON OIL*, Limousin. xxv, 70;—*IODIFORM*, Gaillard. xxv, 71; Legras. xxviii, 49; Mueller. xxx, 113;—*MEDICATED*, Legras. xxviii, 49—*NITRATE SILVER*, Bouillon. xxiii, 311; Huber. xxv, 70; elastic (*Laminaria*), Pajot. xxvii, 75—*OIL CADE*;—*OPHTHALMIC*;—*RED PRECIPITATE*, Legras. xxviii, 49;—*TANNIN AND GLYCERIN*, Schuster. xix, 167;—*TAR*;—*TURPETH MINERAL*, Legras. xxviii, 49.
- Penicillium GLAUCUM** cont. mannite, Muntz. xxiii, 122.
- Pennan kottai**=*Sapindus trifolius*, India. xxvi, 166.
- Penni tora**=*Cassia occidentalis*, Ceylon. xxvii, 474.
- Pennsylvania**, pharmacy law. xviii, 316; xxvi, 663; xxix, 375.

- Pennsylvania SALT MANUFACTURING COMPANY**, statistics. xxiv, 536.
- Pennywort**, *INDIAN*=*Hydrocotyle asiatica*, India. xxiv, 725.
- Pentachlorethane**, composit. and boiling point. xxix, 293.
- Pentaclethra MACROPHYLLA**, Africa, descript., Möller. xxix, 116.
- Penta-nitrocellulose**, Wolfram. xxvii, 437.
- Penthorum SEDOIDES**, Kansas. xxix, 443.
- Pentstemon PUBESCENS**, Kansas. xxix, 451.
- Peonia del pays**=*Cyperus rotundus*, Mexico. xxiv, 769.
- Pepa leaf**, China. xxiv, 757.
- Pepa**, see **PUMPKIN SEED**.
- Pepper**, **BLACK**, literature. xxiv, 199—adult. of powd. xxi, 486, 502; xxii, 164; xxiii, 508; xxiv, 407; xxx, 576—adult. of whole. xxiii, 221; xxiv, 407—analysis, Blyth. xxiv, 197, 8—ground commercial is a mixture of several varieties, Chevallier. xxiv, 198—cultivat. in Cochin China. xxvii, 262; in India. xxiv, 719—weight of 100 pepper-corns of five commercial varieties, Chevallier. xxiv, 198.
- CANARSIE**, India. xxviii, 192.
- CAYENNE**, see **CAPSICUM**.
- LONG**;—**MALABAR**;—**PENANG**, analysis, Blyth. xxiii, 221.
- RED**, see **CAPSICUM**.
- SUMATRA**;—**TELLICHERRY**;—**TRAUG**;—**WHITE**, analysis, Blyth. xxiii, 221.
- Peppergrass**=*Lepidium virginicum*, Kas. xxix, 443.
- Peppermint**, loss in drying. xxi, 202—cultivat. in Australia. xxviii, 100; Lincolnshire, Holmes. xxx, 171; at Mitcham. xxiii, 150; in Oatacamund. xxix, 115; in U. S. xxx, 171.
- tree**=*Eucalyptus amygdalina*, Australia. xxi, 247;—=*Eucalyptus odorata*, Australia. xxi, 249.
- Pepsin**. xviii, 73—act. of carbonates of alkal. earth, Scheffer. xxi, 402; of fibrin, Willich. xxi, 404; xxiii, 468; of tannin, Lewin. xxix, 362—action, when in alkal. solut., Scheffer. xx, 81—examin. of commercial, Lietzenmayer. xxix, 364; James. xxviii, 361—dialyzed, Andouard. xxvi, 631—how obtained, Hoffmann xviii, 75—glycerin extract, Poster. xix, 234—as adjuvant to medicine, prevents digestive disorders, Finzelberg. xxviii, 360—absolutely incompatible with ammonio-citrate of bismuth, Scheffer. xxi, 403—relation to peptone, Kossel. xxv, 328—ought to be replaced by peptone, Maly. xxix, 364—**PREPARATION**, Beale (scaling the scraped mucus). xxi, 403; Heintz (odor removed by exposure to the air). xix, 233; Petit (in 5 p. c. alc.). xxix, 363; Scheffer. xxi, 447; Symes (prefers Scheffer's). xxii, 287; Wrenn (reprecipitate with alc.). xxix, 363—in seasickness. xxx, 456—solut. in citrate ammon., Neynaber. xxix, 364—**TESTS**: Baden-Benger. xxx, 456; Dowdeswell. xxx, 456; Petit. xxviii, 360.
- ELIXIRS**, comparat. examin., Hager. xix, 233.
- "EXTRACTIVE"**, Schmidt. xxix, 107.
- LIQUID**, Scheffer. xviii, 271; xix, 234—mouldiness prevented by increasing glycerin, Scheffer. xix, 233.
- LIQUID, AROMATIC**, Biroth. xxvii, 91.
- OSTRICH**. xxiv, 390; xxvii, 541.
- SACCHARATED**, Scheffer. xix, 233.
- VEGETABLE**=acid exud. fr. leaves of *Nepenthus*, Gorup-Besanez and Will. xxv, 329.
- Pepsina "NOSTRA"**, Arg. Republ. is ostrich pepsin. xxvii, 541.
- Peptone**, act. of tannin, Lewin. xxix, 362—color react. with potassa, copp. sulph. xxx, 452—is a chemical compound, Herth. xxviii, 362—a hydrated proteid, Maly; Darby. xxvii, 541—dry, Blankiewicz. xxvi, 633—in enemata, Henninger. xxx, 458—estimation, Defresne. xxx, 458—relation to pepsin, Kossel. xxv, 328—ought to replace pepsin, Maly. xxix, 364—fr. seeds of *Lupinus varius*, Vines. xxviii, 366—fr. blood fibrin, Adamkiewicz. xxvi, 632—pure, fr. albumen, Maly. xxix, 365—administration, Pettit. xxx, 457—peptone forming ferments in plants, Gorup-Besanez and Will. xxv, 329.
- Peptone, MEAT**, Chapoteaut. xxix, 365.
- MERCURIC**, keeps better than albuminate of mercury, Bamberger. xxv, 329—prep., Kaspar. xxx, 460—for hypodermic injection, Pettit. xxx, 458.
- PANCREATIC**, Chapoteaut. xxix, 365.
- PAPAW**, Chapoteaut. xxix, 365.
- PEPSIC (peptic)**, the most agreeable, Chapoteaut. xxix, 366.
- PEPSIN-CHLORHYDRIC**, Pettit. xxx, 457.
- PEPSIN-TARTARIC**, taste best, Pettit. xxx, 457.
- Peptonized beef**, MENSMAN'S analysis, Tschepp. xxviii, 54.
- Péra-virai**=*Cassia sophora*, India. xxvi, 166.
- Perchlorethan**, comp. and boil. point. xxix, 293.
- Percolation**. See also **FLUID-EXTRACTS**; **DISPLACEMENT**.
- history, Lloyd. xxvii, 691—objection of French commission on "Codex." xxx, 31—is not displacement, Rosenwasser. xxx, 527—necessary condit. to successful percol., Lloyd. xxvii, 682—Campbell. xxiii, 599—Hirsch. xviii, 146—Lloyd. xxvii, 684; xxix, 408; xxx, 509—Markoe. xxx, 658—Moore. xxii, 48—Remington. xxvii, 787—Rosenwasser. xxx, 519, 543—Squibb. xviii, 163.
- use of maceration, Squibb. xxvi, 727, 747—percolation *vs.* maceration, percolators, Stoddart; Tucker. xxi, 194—mechanics of percolation, Lloyd. xxvii, 691, 2...—change of solvent power of menstruum, Lloyd. xxix, 410, 5—packing unreliable, Eberle. xxvii, 788; regulating pressure in packing, Squibb. xxvi, 906.
- CONTINUOUS**. xxx, 36; Cazeneuve and Caillot. xxv, 49; Guérin. xxviii, 27; Drechsel. xxvi, 53.
- FRACTIONAL**, Diehl. xxvi, 105; xxvii, 728; Hirsch. xviii, 146.
- with increased hydrostatic pressure, Proctor. xxvi, 275.
- INTERMITTENT**, Fairthorne. xxx, 115.
- UPWARD**, Elborne. xxviii, 78.
- Percolator**, see also **DISPLACER**. Diehl (tall, slender, little tapering). xxvii, 728—Fenner (percolator and still combined). xxx, 35—Lloyd. (height). xxvii, 697, 8, 9—O'Donnell (a convex diaphragm instead of a plug). xxiv, 489—Rosenwasser (modified "Real"). xxx, 32, 540—Squibb. xx, 182; xxvi, 100, 102, 3, 4, 735, 9, 740, 2.
- VACUUM**, Smith, Kline & Co.; Stearns. xxx, 33, 5.
- STAND**, Remington. xxvi, 52—Squibb. xxvi, 100, 735.
- Perdinion**=*Parietaria officinalis*, Greece. xxv, 122.
- Pereirina** (=Geissospermia), Hesse. xxvi, 217, 8.
- Perezia ARIZONICA**, Palmer. xxvii, 285.
- Perfumery**, see **BOUQUETS**; **EXTRACTS**; **SACHETS**, etc.
- Centennial exhibition. xxiv, 815.
- PLANTS**, cultivat. in Australia, Schomburgh. xxviii, 100—in France. xxiv, 822; xxvii, 380.
- HISTORY**, Saunders. xxiv, 496.
- FORMULAS**, Avery. xxvii, 124—Dubelle. xxvii, 124—Saunders. xxiv, 496.
- Perfumes**, extracted by methyl chloride, Vincent. xxviii, 263.
- Perilla ARGUTA**, Japan, descript., Holmes. xxviii, 128—*P. OCIMOIDES*, Japan. xxvi, 296.
- Périme vierge**=turpentine fr. Aleppo pine, France. xxvi, 323.
- Peristrophe BICALYULATA**, India, descript., Dymock. xxvi, 159.
- Peritre**=*Erigeron affine*, Mexico. xxiv, 775.
- Periwinkle**, see **VINCA**.
- Perlilla**, Arg. Republ. xxiv, 761.
- Peroo**=bark of *Psidium pomiferum*, India. xxv, 203.
- Perry Davis PAIN-KILLER**, analysis, Pierron. xxiv, 421.
- Persea GRATISSIMA**, Mexico. xxiv, 771—*P. LINGUE* (Chili, Arg. Republ.), analysis, Arata. xxx, 155.
- Persian berries**, see **RHAMNUS INFECTORIUS**.
- Persicaria, water-**, =*Polygonum amphibium*, Kansas. xxix, 449.
- Persicin** in *Pyrethrum roseum*, Rother. xxv, 157.
- Persiretin** in *Pyrethrum roseum*, Rother. xxv, 157.

- Peru**=*Schinus molle*, Mexico. xxiv, 777.
 — balsam, see BALSAM, PERU.
Peruvian Bark, see CALISAYA and CINCHONA.
Pessaries, gutta percha, Duquesnel. xxvi, 138.
Pestles, CEMENT, Fairthorne. xxx, 57.
Petalestigmia QUADROULARIS, Queensland. xxiv, 740.
Petaree=*Abutilon indicum*, India. xxvi, 162.
Peterman's MICHIGAN AGUE CURE, analysis, Churchill. xxiv, 417.
Petguli=*Dalbergia sympathetica*, India. xxvi, 159.
Petrocen fr. Am. petroleum, Tweddle; Prunier. xxvii, 377.
Petroleum. See also OILS, MINERAL.
 — AMERICAN, contains thirteen liquid hydrocarbons, comp., and prop., Pelouze and Cahours. xix, 238—its crystalline hydrocarbons, Tweddle, Prunier and David. xxvii, 377—dissolves 6 to 7 vols. liquid carbonic acid, Cailletet. xxi, 285—constituents useful in pharmacy, Sheppard. xxx, 58.
 — CRUDE, SEMI-SOLID, therapeutical value, Griffith. xxviii, 260.
 — DEODORIZED (alc., nitr., sulph. ac.), Masson. xxv, 270—FIRE extinguished by chloroform. xxiii, 317—illuminating GAS, Hirzel. xix, 239—for OINTMENTS, Clark. xxix, 284—distinguishing charact. fr. shale products, Allen. xxx, 313—SOLIDIFIED (soap bark and root). xxvii, 379; (soap), Johansen. xxx, 315—statistics. xxiii, 630—detect. of sulphur, Hager. xxv, 271; Vohl. xxv, 270—act. of direct sunlight, xxi, 319—testing, Calvert. xix, 240.
 — in California. xxvii, 596—in Peru (differs fr. the Pennsylvania). xxi, 320.
 — ETHER. See also GASOLIN—act. upon resins, gum resins, balsams, Hirschsohn. xxvi, 457.
 — SPIRIT (=benzin) prop., Allen. xxix, 283, 4—see also BENZIN.
Petromyzon FLUVIATILIS, Caspi in sea, oil fr. liver. xxvi, 331.
Peucedanum LEOCARPUM, California. xix, 302.
Peumus BOLDO. xxiii, 227. See also BOLDO.
Peziza AERUGINOSA, causes format. of xylindein. xxiii, 459; xxiv, 385—*P. RUTILANS*;—*P. VENOSA*, cont. oxalic ac., Hamlet and Plowright. xxvi, 177.
Pfeiffer, Adolph. xxiv, 676, 677, 679, 683.
Pfizer, Chas. & Co., statistics of manufacture. xxiv, 534.
Phaca VETICA, Morocco. xxiv, 115.
Phalaris ARUNDINACRA, ergot, Wilson. xxiv, 120.
Phalmodecca=*Batatas paniculata*, India. xxviii, 131.
Phalon's ENAMEL;—ORIENTAL CREAM;—VITALIA analyzed, Chandler. xviii, 215.
Pharaoh's SERPENTS, harmless, Baer. xix, 165; xxi, 146.
Pharbitis CONVOLVULUS, China. xxiv, 753.
 — NIL, India. xxiv, 726.
Pharmaceutical APPARATUS, Centen. exhibit. xxiv, 836.
 — CONGRESS, INTERNATIONAL. See CONGRESS.
 — EDUCATION, Parrish, xix, 33—Prescott. xix, 425.
 — LEGISLATION. See PHARMACY LAWS.
 — PREPARATIONS, color comparison (spectroscope), Gilmour. xxvi, 85.
 — preparations, CENTENNIAL EXHIBIT. xxiv: Argentine Republic, 813—Brazil, 813—Egypt, 812—France, 807—Germany, 808—Great Britain, 805—Italy, 81;—Japan, 812—Norway, 8.9—Portugal, 815—Spain, 814—Sweden, 813—Switzerland, 813—Turkey, 813—U. S., 802.
Pharmacist, definition of term, Robbins. xix, 412.
Pharmacognostic system (according to the most promin. medicinal constituent), Buchheim. xxvii, 129.
Pharmacopœia, Chili. xix, 315—Germany. xix, 315—Holland. xix, 316—international, Maisch. xxii, 474, 519.
 — U. S., improvements desired, Oldberg. xxi, 577—"improving," Painter. xxv, 353—preparations, what they ought to be, Squibb. xxvi, 97, 708.
 — U. S. (1870), report, Markoe. xxi, 509.
 — U. S. (1880) revision: discussions. xxiv, 630;
Pharmacopœia (Continued).
 xxv, 531, 2, 554; xxvii, 795—proposition to the Am. Medical Assoc., Squibb. xxiv, 634—resolution, Hoffmann. xxv, 534; Squibb. xxiv, 629, 630—REPORT, Rice. xxvi: additions proposed, 673—alphabetical arrangement, 672—chemical formula, 677—crude drugs, 676—endproducts, weights, 678—fluid extracts, 678—general principles, 672—language, 672—quantity, expressions, 677—strength of preparat., 677—prep. to be discarded, 672—tables, 679—temperature, 677.
Pharmacy, conditions, Benjamin. xxiv, 448—definition of term, Robbins. xix, 412, 3—elegant, Remington. xxii, 503—history, Bullock. xxv, 475; Hancock. xxii, 479—inspection (out of place in U. S.), Balluff. xx, 163—limitat. proportionate to number of inhabit. (out of place in U. S.), Balluff. xx, 163—fixed prices (out of place in U. S.) Balluff. xx, 163.
 — status: at the time of Columbus. xxvi, 842—ARGENTINE REPUBLIC, Wheeler. xxiv, 441—BRAZIL, Wheeler. xxiv, 447—CALIFORNIA, Wenzell. xviii, 198—CANADA, Saunders. xix, 429—CHILI, Wheeler. xxiv, 445—CHINA, Debeaux. xxii, 31—EUROPE. xxii, 25—FRANCE, Baudrimont and Barbet. xxii, 29—GERMANY, Hlasiwetz and Hoffmann. xxii, 26—GREAT BRITAIN. xxii, 30—SOUTH AMERICA, Wheeler. xxiv, 441—SOUTHERN UNITED STATES, Caldwell. xviii, 194—UNITED STATES, Robbins. xix, 415—URUGUAY, Wheeler. xxiv, 446.
Pharmacy Laws: AUSTRALIA. xix, 315—AUSTRIA. xix, 316—BELGIUM. xix, 316—GREAT BRITAIN. xix, 315—ITALY. xix, 317—NOVA SCOTIA. xxv, 382, 390—ONTARIO. xix, 354; xxiii, 543—PORTUGAL. xix, 317—QUEBEC. xxiii, 543, 6—SPAIN. xix, 316.
 — United States: passed in 1870. xviii, 309—ALABAMA. xxii, 330; xxx, 474, 480—ARKANSAS. xxix, 376, 9—BALTIMORE. xviii, 314; xx, 148, 153; xxiv, 429, 431—CALIFORNIA. xix, 314; xxvi, 664; xxviii, 581; xxix, 375, see SAN FRANCISCO—COLORADO. xxx, 475, 480—DISTRICT OF COLUMBIA. xxvi, 662, 4—CONNECTICUT. xxix, 376, 9; xxx, 475, 481—GEORGIA. (since 1824). xxii, 331; xxx, 475, 483—ILLINOIS. xix, 314, 356; xxi, 506; xxix, 376, 381—INDIANA. xxx, 476, 485—IOWA. xxviii, 579; xxx, 476, 486—KANSAS. xxix, 375—KENTUCKY. xxii, 330, 335; xxiv, 605; xxv, 380, 3; xxx, 477, 490—KINGS COUNTY (N. Y.). xxvii, 659, 663—LOUISIANA. xxx, 477, 491—MAINE. xxv, 380, 5—MARYLAND, see BALTIMORE—MASSACHUSETTS. xix, 356; xxix, 375; xxx, 477, 492—MICHIGAN. xix, 356; xxv, 394—MINNESOTA. xxx, 478, 493—MISSISSIPPI. xxviii, 582—MISSOURI. xxii, 331, 3; xxiv, 435; xxvii, 661, 6; xxix, 376, 385; xxx, 478—NEBRASKA. xxi, 506—NEW HAMPSHIRE. xix, 356; xxiii, 542, 5—NEW JERSEY. xix, 314, 356; xx, 150; xxii, 330; Mercen. xxiii, 551; x.v, 381, 8; xxvii, 659, 661; xxx, 478—NEW YORK. xix, 314, 355; xx, 147, 150; xxv, 510; xxix, 375—NORTH CAROLINA. xxix, 367, 387—OHIO. xix, 356; xx, 150; xxi, 505, 6—PENNSYLVANIA. xviii, 316; xxvi, 663; xxix, 375—PHILADELPHIA. xx, 149, 156—RHODE ISLAND. xviii, 309; xix, 353, 6, 9; xx, 146—SAN FRANCISCO. xx, 148, 159; xxiv, 430, 2, see CALIFORNIA—SOUTH CAROLINA. xx, 60, 301; xxiv, 430, 6; xxviii, 583—ST. LOUIS. xxii, 331—TENNESSEE. xxx, 478, 494—TEXAS. xxx, 478, 495—VIRGINIA. xix, 356, 374—WEST VIRGINIA. xxix, 377, 391; xxx, 478, 495—WISCONSIN. xxx, 479, 498.
Phaulga=*Pogostemon purpuricaulis*, India. xxv, 143.
Phenanthren, synthetically fr. stilbene, Græbe. xxii, 212.
Phénicienne, see PHENYL BROWN.
Pheno-glucoside, Michael. xxviii, 344.
Phenol, see also ACID, CARBOLIC.
 — synthesis fr. acetylene, Berthelot. xix, 250.
 — CAMPHORATED, is safer and less unpleasant. Bufalini. xxiv, 298.
 — IODIZED, as caustic, Battey. xxv, 70; xxviii, 285.

- Phenolphthalein** in alkalimetry. Drew. xxvii, 524—bicarbonates are without act., although carbonic acid is. Vielhaber. xxvii, 524.
- Phenol-sodique**, Phar. Soc. Paris. xxv, 84.
- Phenyl compounds**. xviii, 249. See also the respective bases.
- **ALLYL**, synthesis fr. benzol, Chojnacki. xxii, 211.
- **BORON**, chloride, Michaelis and Becker. xxx, 350.
- **BROWN**, constitut. and prep., Bolley and Hummel. xix, 250.
- **CYANIN**, prep., Phipson. xxiii, 353.
- Philadelphia College of Pharmacy**, arrangement for the reception of foreign pharmacists in 1876. xxiii, 772—correction of earlier historical dates. xxii, 22—letter of invitat. to make the College the headquarters in 1876. xxiii, 844—extract fr. minutes about prescription writing. xxiii, 803—import and export of drugs and chemicals. 1876. xxiv, 400.
- Philippia**, equivalent and spectrum, Delafontaine. xxvii, 343.
- Philippine Islands**, drugs at Centennial exhibition. xxiv, 767.
- Philippium** (of Delafontaine) is "X" of Loret. xxviii, 258—prop., Delafontaine. xxvii, 341—fluorescence of salts, Soret. xxviii, 346.
- Phleum PRATENSE**, ergot., Wilson. xxiv, 120.
- Phlomiasmena PSARIA**, Greece. xxvii, 266.
- Phloridzin**, act. of heat, Schiff. xxix, 350; of sulphomolybd. ammon., Buckingham. xxi, 369—color react. (chlorin. sod. or lime), Wellcome. xxiii, 392; (sulph. ac., ferric chloride), How. xxvi, 561—decomposition product, Schiff. xviii, 439; Löwe. xxiv, 370.
- Phloretin**, prep. and prop., Schiff. xxiii, 439.
- Phloroglucide**, prep., prop., Schiff. xxiii, 440.
- Phloroglucin**, Schiff. xxii, 440—as test for lignin, Wiesner. xxvii, 436.
- Phlorose**, fr. phloridzin, Hesse. xxvii, 525; xxviii, 301.
- Phlox CAROLINA**, as subst. for spigelia. xxiii, 509.
- Phoenix DACTYLIFERA** cont. spherocrystals of glucose in fruit, Braun. xxvii, 443. See also **DATES**.
- Phoenix tail grass**, China. xxiv, 756.
- Phonolith**, for obtaining chloride sodium crystals, Rose. xxii, 188—solubility in water, Cossa. xix, 196.
- Phoradendron FLAVESCENS** (American mistletoe). xxvi, 247—Kansas. xxix, 448.
- Phormium TENAX** (New Zealand flax), prop. xix, 296.
- Phosgen gas** (chloro-carbon. ac.) decomp. product of chloroform by air and light, Emmerling and Leugel. xix, 252—occurs only when chlorof. is kept in black bottles, never in direct sunlight, Rump. xxiii, 343.
- Phosphates**, fr. iron slags, Thomas. xxix, 252—insoluble transformed into soluble by sulphurous ac., Garland. xxi, 140.
- **COMPOUND POWDER**, Hancock. xxii, 339.
- Phosphorescent powder**. xxx, 106.
- Phosphoretted RESIN** and pharmaceut. preparat., Sloan. xxiii, 616—discussion. xxii, 553—emulsion, Pile. xxiii, 807—prep., Pile. xxii, 376; Sloan. xxiii, 617; xxiv, 94; Squibb. xxiv, 472—loses its odor, Saunders; Wellcome. xxiii, 808.
- **TOLU**, easier made than phosph. resin, Abraham. xxiii, 85.
- **WAX**, better than resin. xxii, 553.
- Phosphorite**, as source of iodine, Thibault. xxiii, 246.
- Phosphorus**. xviii, 226; xix, 194; xxi, 280; xxiii, 251; xxiv, 222; xxv, 247; xxvi, 359; xxvii, 312; xxviii, 227; xxix, 251; xxx, 278.
- the first made in U. S. (fr. spent bone black). xxi, 128—act. of ammonia, Blondlot. xviii, 226; xix, 196—administration (emuls. of oil), Redwood. xxiii, 78; (cod-liver oil), Squibb. xxiv, 468—p. c. of arsenic in commercial, Dohme. xxiv, 541; Rademaker. xix, 195—**ANTIDOTE** (sulph. copper), Jandousch. xxviii, 91; (freshly precip. oxide iron), Hager. xxviii, 92; (oil turpentine), Köhler; Schimpf. xxi, 281; (value denied, Curie and Vigier. xviii, 293)—in
- Phosphorus**. (Continued.)
- bisulph. carbon., explodes with pot. chlor., Moigno. xxi, 280; Proctor. xxviii, 227—caution in using it, Squibb. xxiv, 470—and chlorate potassium, Boettger. xxiii, 251—reduces copper, Sidot. xxvi, 403—estimat. as phosphomolybd. ammon., precautions, Finkener. xxvii, 313—**ODOR**, taste and phosphorescence destroyed by several oils and tinctures, Urwick. xxvi, 110—how best isolated in forensic cases, Bastelaer. xxi, 280—as test for iodates, Pollacci. xxiii, 250—manufacture, Redman. xxviii, 227; Wöhler. xxi, 139—in **MIXTURES**, Méhu. xxiv, 83; Squibb. xxiv, 624, 4, 5, 7, 8—changes odor of essential oils, Menninger. xxiv, 623—in pills, see **PILLS**—in powder (calc. carb., or phosph.; ether), Squibb. xxiv, 480—**POWDERING** (conc. solut. of salt). xxx, 278—**SOLUBILITIES**, Cowdrey. xxiii, 251—soluble in acet. ac., Vulpus. xxvi, 359; xxvii, 312; alcohol, Schacht. xxix, 251; glycerin. xxiii, 76; stearic acid. xxvii, 313—solutions in ether, chloroform, cod-liver oil. xxvii, 91, 2—**TEST** (magnesium). xix, 194; (nitrate silver paper). xxviii, 227—therapeutics, Squibb. xxiv, 468.
- **ALLOTROPIC**. See **PHOSPHORUS, RED**.
- **AMORPHOUS**. See **PHOSPHORUS, RED**.
- **LAMP** (with phosph. oil). xxv, 56.
- **OXYIODIDE**, Burton. xxx, 278.
- **PASTE**, Mylius. xxvii, 123; Rother. xxi, 140; xxvi, 156.
- **PENTASULPHIDE**, Schering. xxi, 281.
- **RED**, analysis, Fresenius and Luck. xxiv, 222—in medicine as substit. for phosphor., Postans. xxiii, 252—therapeutically inert, Thompson. xxiv, 222; Squibb. xxvi, 625.
- **SULPHIDES**, Ramme. xxviii, 228.
- **SULPHOBROMIDE**, prep. and prop., Baudrimont. xxiii, 252.
- **TRISULPHIDE**, Schering. xxi, 281.
- Photographic album**. xx, 95—to British Pharm. Conference. xxi, 87—fr. English pharmacists. xx, 56—circular. xix, 63—report of committee. xix, 62.
- Photographs**, re-touching varnish. xxiv, 113.
- Photometer, spectro-**, Hüfner. xxvi, 85.
- Phthalyl-tropein**, Ladenburg. xxviii, 321; xxix, 337; xxx, 424.
- Phulphura**=*Calosanthus indica*, India. xxv, 146.
- Phulwa**=*Bassia butyracea*, India. xxvi, 129.
- Phycocoll**, glutin of *Alga*, Marchand. xxix, 118.
- Phycoseris CRISPA**, Turkestan. xxi, 203.
- Phyllanthus EMBLICA**. xviii, 285—in India, descript., Dymock. xxviii, 194. See also **MYROBALANS**.
- **MATRASPATENSIS**, India, descript., Dymock. xxvi, 159.
- **NIRURI**, India, descript., Dymock. xxviii, 194.
- **URINARIA**, India. xxviii, 194.
- Phyllocladus TRICHOMANOIDES**, New Zealand. xxiv, 737.
- Phyllocyanin** in alkalimetry, Pellagri. xxiv, 384.
- Physalis SOMNIFERA**, India. xxiv, 724—descript., Dymock. xxvi, 160.
- **VISCOSA**, Kansas. xxix, 451.
- Physcia PARIETINA**, as source of chrysophanic acid, Lindsay. xxv, 65.
- Physic nut**=*Jatropha curcas*, India. xxiv, 723.
- Physicians** as examiners in pharmacy, objections to. xxvi, 662, 3—and pharmacists, relations, Nichols. xxiii, 557.
- **POCKET CASES**, Squibb. xxi, 542, 6.
- Physosterin**=cholesterin fr. calabar bean, Hesse. xxvii, 257.
- Physostigma CYLINDROSPERMA**, descript., Holmes. xxvii, 256, 7.
- **VENENOSUM**, descript. of bean, Holmes. xxvii, 227. See also **CALABAR BEAN**.
- Physostigmia**. See also **ESERINA**—color react. with mur. ac. and ammon., Petti. xxii, 272—not crystalline, as Vée asserts, Hesse. xxvi, 294—physiolog. act., Harnack and Witkewsky. xxvi, 293—prep., Kennedy. xxiii, 605.
- **SALICYLATE**, is a stable compound, Merck. xxvii, 516.
- Phyto-chemistry**, chemical substitution, Strohecker. xix, 309.

Phytolacca AUSTRALIS, Chili. xxiv, 765.

— *DECANDRA*, adult. of powd. xxx, 576—constituents of berries, Cramer. xxx, 160—phytolaccic acid in berries, Terreil. xxx, 160—germinat. of seed, Saunders. xxx, 567—is poisonous, Cressler. xxiii, 147—constituents of root, Pape. xxx, 160—therapeutical value of root, Westerfield. xxx, 159—eighty years ago. xxvi, 849—in Kansas. xxix, 449.

— *DIOICA* (Brazil, Mexico,) analysis of fruit, Balaut. xxx, 161.

— *ELECTRICA*, Levy. xxvi, 201—*P. OCTANDRA*, China. xxiv, 756.

Phytolaccaceae, Kansas. xxix, 449.

Phytolaccin, prep. and prop., Classen. xxviii, 349.

Phyto-tyrosin fr. *Agonidia lancifolia*, Peckolt. xviii, 279.

Picea, of *DODONÆUS*=*Abies pectinata*, D. C. xxvi, 313;—of *PLINY*=*Abies excelsa*, D. C. xxvi, 323.

— *BALSAMEA*, Loud.=*Abies balsamea*, D. C. xxvi, 314.

— *BRACTEATA*, California. xxvii, 601;—*P. CEPHALONICA*, Greece. xxvi, 313;—*P. EXCELSA*, Link=*Abies excelsa*, D. C. xxvi, 323;—*P. GRANDIS*, California. xix, 306; xxvii, 601.

— *LATINORUM*, J. Bauh.;—*P. MAJOR PRIMA*, C. Bauh.=*Abies excelsa*, D. C. xxvi, 323;—*P. PECTINATA*, Loud.;—*P. TAXIFOLIA*, Hort.=*Abies pectinata*, D. C. xxvi, 313;—*P. VULGARIS*, Link=*Abies excelsa*, D. C. xxvi, 323.

Picene, in California petroleum, Gräbe and Walter. xxix, 285—fr. coal tar, constitution, Burg. xxix, 285.

Picequinone, fr. coal tar, Burg. xxix, 285.

Pichana, Arg. Republ. xxiv, 762.

Pichoa, Arg. Republ. xxiv, 762.

Pickeringia MONTANA, California. xix, 301.

Picraconitia, in *Aconit. paniculatum*, Cleaver. xxx, 210—prep., prop., Wright and Luff. xxvi, 598.

Picraena EXCELSA, Jamaica. xxiv, 733.

Picramnia CILIATA, Brazil. xxvi, 217.

Picrasma NEPALENSIS;—*P. QUASSINIDES*, India. xxiv, 165.

— *VELOZII*, Brazil. xxiii, 121.

Picrodaphne—*Nerium oleander*, Greece. xxiv, 136.

Picrodendron CALUNGA, New Granada. xxviii, 167.

Picropodophyllin, Podwyssotski. xxix, 191.

Picrotin, fr. *picrotoxin*, not poisonous, Barth and Kretschy. xxviii, 348; xxix, 352.

Picrotoxin, act. of arseniate sod., Tattersall. xxviii, 324—antagonized by chloral-hydrate, Husemann. xxvii, 507—detect. in beer, Dragendorff. xxx, 339; Hoffstadt. xxii, 227; Wittstein. xxiii, 341—contains three constituents, Barth and Kretschy. xxviii, 347; xxix, 352—microsublimating point, Blyth. xxvii, 483—prep., Phar. Soc. Paris. xxvi, 616—reactions, Ogliastro. xxvii, 530—prop., Apjohn. xxiv, 380.

Pied-poule—*Cassia occidentalis*, Martinique. xxix, 209.

Pigeon, WILD, manure in gonorrhœa, India. xxi, 620.

Fignuole, a variety of olive, Italy. xxi, 217.

Pigweed—*Amaranthus albus*, Kansas. xxix, 439.

Pile, W. H. ammonium bromide. xxii, 434—Baumé and specific gravity. xviii, 155—dialyzed iron. xxv, 452—graduated measures. xxi, 573—hydrometers for special purposes. xxii, 366—phosphoretted resin. xxii, 376; xxiii, 807—seidlitz powder. xx, 90—syr. iodide iron. xxiv, 492—tinct. chlor. iron. xxiv, 677.

— discussions: xx, 90; xxi, 71, 85, 86; xxii, 499, 502, 524, 529, 554; xxiii, 806, 807, 812, 813, 818; xxiv, 664, 665, 673, 677, 678, 680, 683; xxv, 512, 559.

Pilea PUMILA, Kansas. xxix, 452.

Piles, ITCHING (black wash), Close. xix, 489.

Pills, general remarks, Thompson. xxviii, 61.

— CHINESE. xxii, 31.

— COATING, Bull. xxvi, 127—(butter cacao), Ditten. xxix, 88—(elm-bark), Hildebrand. xxv, 94; xxvii, 99—(French chalk), Cope. xxiii, 82; Symes. xxvi, 126—(rosin), Ebert. xix, 157; Whitfield. xxiii, 82. "GELATIN" and "SUGAR," see below.

Pills, COMPRESSED, Dunton and Co. xxiv, 692—(use French chalk), Fairthorne. xxix, 259—apparatus, Remington. xxiii, 624; xxiv, 88; Smedley. xxvii, 99.

— DIVIDER, White. xxix, 86.

— EXCIPIENT (ought to be recorded on the prescription), Emanuel. xxvi, 90—(bals. fir or wax), Dannecy. xxvi, 127—(alth., tragac., syr.), Beitemann. xxviii, 62—(elm-bark, tragac., syr.), Mattison. xxvii, 99—(glucose), Lascheid. xxx, 100—(glycerin), Emanuel. xxiv, 90—(glyc., tragac.), Cheatham. xxvi, 131; Thresh. xxv, 94; Turney. xix, 157; Welborn. xxvi, 128—(honey, glyc., tragac.), Wiegand. xviii, 208—(manna), Fairthorne. xxx, 101; England. xxi, 136—(soluble cream tartar). xxi, 136; (objection to it), Tearle. xxi, 175—(citrate pot.), Tearle. xxi, 175—(sod. or pot. ricinoleate), Giffard. xxvi, 145—(starch, sugar, trag.), Brown. xxvi, 131.

— GELATIN-COATED (fraudulent; pills 44 p. c. under weight), Remington. xxiii, 623.

— GELATIN-COATING, Allaire. xxiv, 91—Dimock. xxviii, 62—Klie. xxvi, 130—Thompson. xxix, 87.

— containing GLYCERIN not objectionable in sil-vering or gilding. xix, 157.

—, HOME-MADE, strongly advocated, Holmes. xxiii, 619.

— keep the MASS READY for rolling out (glyc.), Wilder. xxv, 93.

— containing ESSENTIAL OILS (equal part bees-wax), Ebert. xix, 157.

— READY-MADE of our day, Remington. xxiii, 620—discussion. xxiii, 796.

— SATURATES, Fuller. xxvi, 89.

— SOLUBILITY. xxiii, 796—Remington. xxiii, 621; xxiv, 91—Campbell. xxiv, 91.

— SUGAR-COATED defence, Moore. xxv, 94—an improvement, Hildwein. xxii, 79—examinat. of commercial (33 to 44 p. c. short), Wells. xxvi, 128.

— SUGAR-COATING, Goodman. xxiv, 90—Neynaber. xxiv, 91—Stearns ("build up"). xxiv, 804.

Pills (PILULÆ), ALBUMEN, IODIZED, Collas. xxiii, 86.

— ALOES, Audhoul. xxx, 101.

— ALOES COMP., Philadelphia Hospital. xxiv, 94.

— ANTI-INFLAMMATION, Hager. xxviii, 63.

— ANTI-NEURALGICÆ, Philadelphia Hospital. xxiv, 94.

— ANTIPHLOGISTICÆ, Hager. xxviii, 63.

— ASAFOTIDA, Beiteman. xxviii, 62.

— BISMUTH, SUBNITRATE, Beiteman. xxviii, 62.

— BLAUD'S FERRUGINOUS. xxvi, 132—Pitschke. xxviii, 62.

— BLUE, see PILLS, HYDRARGYRI.

— BRANDRETH, Hager. xviii, 214.

— CALOMEL, Beiteman. xxviii, 62.

— CAPSICUM, Beiteman. xxviii, 62.

— CARBOLIC ACID, Diehl. xix, 157.

— CASTOR OIL (magnesium ricinol.), Giffard. xxvii, 101—(so-called). xxv, 95.

— CATARRH, Hager. xxviii, 63.

— CATHARTIC, COMP. (minute criticism), Klie. xxvi, 128—keep shape (hot mortar, roll out hot), Maisch. xxvi, 130—examin. of commercial, Wells. xxvi, 128.

— CHIAN TURPENTINE, Jansen. xxix, 224.

— CINCHONA ALKALOIDS, ACID, Hager. xxviii, 63.

— CINCHONIA and ARSENIC, Philadelphia Hos-pital. xxiv, 94.

— CINCHONIA COMP., Philadelphia Hospital. xxiv, 94.

— COLOCYNTH and BELLADONNA, Philadelphia Hospital. xxiv, 94.

— COPAIVA (magnes., water), Wilder. xxvi, 131.

— COUGH, RICORD'S. xxvi, 133.

— DIGITALIS, Beiteman. xxviii, 62.

— DINNER, Hager. xxviii, 63.

— EMMENAGOGUE. xxv, 95.

— HYDRARGYRI, U. S. Ph., Bibby. xxiv, 92—Remington. xxix, 88—(quality affected by age), Senier. xxiv, 92.

— HYOSCYAMUS COMP., Hooker. xxvii, 101.

- Pills, IPECAC and SQUILLS**, Ph. Brit., Shuttleworth. xxiv, 181.
- **IRON and ALOES**, Craig. xxiii, 85.
- **IRON BROMIDE**, Prince. xxiii, 86.
- **IRON CARBONATE**, Chipman. xxi, 600; xxii, 79—Maisch; Wilder. xxx, 101. See also PILLS, BLAUD'S.
- **IRON by HYDROGEN**, Beitenman. xxviii, 62.
- **IRON IODIDE**, Magnes-Lahens. xxii, 77.
- **IRON PROTOCHLORIDE**, Gilmour. xxix, 89—Phar Soc. Paris. xxvi, 132.
- **IRON PROTOXIDE**, Kirchmann. xxi, 175.
- **IRON PYROPHOSPHATE**, Beitenman. xxviii, 62.
- **IRON SULPHATE**, Beitenman. xxviii, 62.
- **KNIGHT'S**. xxvii, 101.
- **LITHIUM IODIDE**, Zeisst. xxx, 102.
- **OIL TURPENTINE**, Lachambre. xxii, 79.
- **OPII CUM PLUMBI ACETATIS**, Philadelphia Hospital. xxiv, 94.
- **OXGALL**, Jewett. xxvii, 101.
- **PHOSPHORI CUM SAPONE**, Ph. Brit., Allen and Hanbury. xxiv, 93.
- **PHOSPHORUS**. xxiv, 31—(bisulph. carbon), Addington. xxiv, 93—(bisulph. carb., chlorof.), Gerard. xxvii, 100—(butter cacao), Frownert. xxiii, 84; Walling. xxiii, 84, 618—(chlorof.), Denham. xxiv, 93, Cherry. xxviii, 63—(mucilage), Corfe. xxiv, 63, Haffenden. xxvi, 131—(syrup). xxvii, 101; Lilly. xxiv, 93—(flour), Neynaber. xxvi, 132—(soap, guaiac resin), Barton. xxvii, 100—(phosphor. rosin), Appleby. xxv, 95—(phosphor. cod-liver oil), Squibb. xxiv, 478, 625, 6—(amorphous phosph.), Postans. xxiii, 85.
- **PLUMBI CUM OPIO**, Ph. Brit., Shuttleworth. xxiv, 181.
- **PODOPHYLLIN**. xxv, 95.
- **PODOPHYLLIN COMP.**, Philadelphia Hospital. xxiv, 94.
- **QUININE SULPHATE**, examin. of commercial sugar-coated, Hogan. xxiii, 83, 518; Lyons. xxii, 79, 316; xxiii, 518; Sørensen. xxiii, 519; Trimble. xxiii, 83, 518—excipient: (acac., glyc.), Brett. xxvi, 130; Berguier. xxii, 79; Nickles. xxvi, 131—(tragac., glyc.), Cheatham. xxvi, 131—(tartar. ac., glyc.), Reynolds. xxiii, 82—(althæa, tragac., syrup), Beitenman. xxviii, 62.
- **RHEI COMP.** examin. of gelatin-coated, Remington. xxiii, 623.
- **RHEI ET GENTIANÆ**, Philadelphia Hospital. xxiv, 95.
- **SALICYLIC ACID**, Mattison. xxv, 464—White. xxv, 294.
- **SAPONIS COMP.**, Ph. Brit., Shuttleworth. xxiv, 181.
- **SODIUM COPAIVATE**, Lucich; Zlamal. xxiv, 284.
- **TAPEWORM**, Peschier. xxi, 176.
- **TRIPLEX** (Dr. Francis'), Squibb. xx, 222.
- Pillu pillu**=*Daphne pillu pillu*, Chili. xxiv, 765.
- Pilocarpene** (hydrocarb. of the volat. oil of *Jaborandi*), Hardy. xxv, 177—identical with *carvene*, Poehl. xxviii, 340.
- Pilocarpina**, name suggested by Holmes. xxiii, 183—act. of ammonia, Hallberg. xxix, 511—antidote to atropia, Kouders. xxx, 423—constitut., Kingzett. xxvi, 603—constit. and physiolog. act., Christensen; Podwissotzki. xxx, 432—decomp. products, Chastaing. xxx, 433—drug market. xxvi, 661; xxviii, 374; xxix, 374; xxx, 473—estimat. and yield, Poehl. xxviii, 339; xxix, 194—effect upon the hair, Schmitz and Coppez. xxviii, 341; xxix, 511—microsublimating point, Blyth. xxvii, 483—act. corresponds with that of nicotin, Harnack and Meyer. xxix, 347—prep., Gerrard. xxiii, 187; xxvi, 602; xxviii, 340; Hardy. xxiv, 164; xxv, 177; Kennedy. xxix, 421, 3; Poehl. xxviii, 340—test, Poehl. xxviii, 339; xxix, 194.
- **CHLORO-PLATINATE**, Kingzett. xxvi, 603.
- **HYDROBROMATE**, Gerrard. xxvi, 603.
- **MURIATE**, solubility, Gerrard. xxvi, 603; Schuchardt. xxix, 348—therapeutical value, Laubzer. xxvi, 604.
- **NITRATE**, prep., Gerrard. xxviii, 340; Phar. Soc. Paris. xxvi, 603—solubility, Gerrard. xxvi, 602; Schuchardt. xxix, 348.
- **PHOSPHATE**, Gerrard. xxvi, 603.
- **SULPHATE**, Gerrard. xxvi, 603.
- Pilocarpus**, see also *JABORANDI*.
- **OFFICINALIS**, p. c. of pilocarpin fr. hair, leaves, bark, Poehl. xxix, 194.
- **PINNATIFOLIUS**. xxviii, 167—account. xxiii, 180—descript., Holmes. xxiii, 183—analysis, Hardy. xxv, 28, 175.
- **PINNATUS**. xxv, 175.
- **SELLOANUS**, Brazil. xxviii, 167.
- Pilpapa**=seeds of *Entada purantha*, India. xxiv, 193.
- Pilulæ**, see **PILLS**.
- Pimiento**, Arg. Republ. xxiv, 762.
- Pimpernel**=*Anagallis arvensis*, Kansas. xxix, 449.
- Pimpinella APIODORA**, California. xix, 302.
- **SAXIPRAGA**, alkaloid, Buchheim. xxii, 124.
- Pimpinellin**, Buchheim. xxii, 124, 280.
- Pin d'ALP**=*Pinus Halepensis*, France. xxvi, 323;—*P. DE BORDEAUX*=*Pinus maritima*, Poiret. xxvi, 317;—*P. D'ECOSSE*=*Pinus sylvestris*, L. xxvi, 317;—*P. FLOUE*=*Pinus Halepensis*, Mill. xxvi, 323;—*P. DE GENEVE*;—*P. DE HAGUENAU*=*Pinus sylvestris*, L. xxvi, 317;—*P. DE JERUSALEM*=*Pinus Halepensis*, Mill. xxvi, 323;—*P. DE L'ENCENSE*=*Pinus tæda*, L. xxvi, 318;—*P. DES LANDES*=*Pinus maritima*, Poiret. xxvi, 317;—*P. ROUGE*;—*P. SAUVAGE*=*Pinus sylvestris*, L. xxvi, 317.
- Pinacolin**, Friedel and Silva. xxii, 251.
- Pinaster**=*Pinus maritima*, Poiret. xxvi, 316;—(OF PLINY)=*Pinus laricis*, Poiret. xxvi, 317;—*P. SYLVESTRIS VULGARIS*, GENEVENSIS, J. Bauh.;—*P. VULGARIS*, Clus.—*Pinus sylvestris*, L. xxvi, 317.
- Pinchcock**, Squibb. xxi, 539.
- Pindar**=*Arachis hypogæa*, Jamaica. xxiv, 732.
- Pine, BROOM-**=*Pinus australis*, Mich. xxvi, 318.
- **CALIFORNIA**, has persistent cones, retaining them for 10–20 years. xxvii, 603.
- **CEMBRAN**=*Pinus cembra*, L. xxvi, 322.
- **CLUSTER-**=*Pinus maritima*, Poiret. xxvi, 316;—*P. CORSICAN*=*Pinus laricis*, Poiret. xxvi, 317;—*P. FRANKINCENSE*=*P. tæda*, L. xxvi, 318;—*P. GEORGIA PITCH-*=*Pinus australis*, Mich. xxvi, 318;—*P. LARCH*=*Pinus laricis*, D. C. xxvi, 317;—*P. LOBLOLLY*=*P. tæda*, L. xxvi, 318;—*P. LONG-LEAVED*=*Pinus australis*, Mich. xxvi, 318;—*P. MONTEREY*=*Pinus insignis*, California. xxvii, 603;—*P. MURRAY*=*Pinus callitris*, Australia. xxiv, 806;—*P. NUT-*=*Pinus sabiniana*, California. xxvii, 603;—*P. OLD-FIELD-*=*P. tæda*, L. xxvi, 318;—*P. PITCH-*;—*P. RED*=*Pinus australis*, Mich. xxvi, 318;—*P. RIGA*=*Pinus sylvestris*, L. xix, 271;—*P. SCOTCH*=*Pinus sylvestris*, L. xxvi, 317;—*P. SCRUB-*=*Pinus sabiniana*, California. xxvii, 603;—*P. SIBERIAN*=*Pinus cembra*, L. xxvi, 322;—*P. SILVER-*=*Pinus sabiniana*, California. xxvii, 603;—*P. SOUTHERN*=*Pinus australis*, Mich. xxvi, 318;—*P. SUGAR-*=*Pinus Lambertiana*, California. xxvii, 603;—*P. SWISS STONE-*=*Pinus cembra*, L. xxvi, 322;—*P. TORCH*;—*P. WHITE*=*P. tæda*, L. xxvi, 318;—*P. YELLOW*=*Pinus australis*, Mich. xxvi, 318; in California = *Pinus ponderosa*. xxvii, 603.
- Pine shoots**, loss in drying. xxi, 203.
- Pinea BALSAMEA**, Rich ex Gord.—*Abies balsamea*, D. C. xxvi, 314.
- Pinellia TUBERIFERA**, Japan, descript., Holmes. xxviii, 100, 2—India, descript., Dymock. xxvi, 161.
- Pinesse**=*Abies excelsa*, D. C., France. xxvi, 323.
- Pinney RESIN** fr. *Vateria Indica*, India. xxiv, 718—TALLOW, analysis, Dalsey. xxvi, 503.
- Pinghwar-djambi**=*Cyathea Smithii*, Sumatra. xxii, 98.
- Pinguica**, Mexico. xxiv, 774.
- Pinguicula VULGARIS**, leaves cont. albuminous crystals, Russow. xxx, 162.
- Pinilia**. See **PINELLIA**.
- Pink, CAROLINA**=*Phlox Carolina*. xxiii, 508.
- Pink root**. See **SPIGELIA**.
- Pinkneya PUBENS**=“pseudo-cinchona,” Southern States, descript. xxix, 166.
- Pinpingo**=*Ephedra andina*, Chili. xxiv, 766.
- Pinsttarini**=*Mylabris cichorei*, India. xx, 249.

- PINUS ABIES**, L.—*Abies excelsa*, D. C. xxvi, 323;—of DUROY—*Abies pectinata*, D. C. xxvi, 313;—*P. AMERICANA PALUSTRIS*, Hort.—*Pinus australis*, Mich. xxvi, 318.
- AUSTRALIS*, Mich., account. xxvii, 384; Morel. xxvi, 316;—*P. AUSTRIACA*. xxvi, 438;—*P. BALSAMEA*, L.—*Abies balsamea*, D. C. xxvi, 314.
- CALLITRIS*, Australia. xxiv, 806;—*P. CANADENSIS*. xxvi, 315;—*P. CEMBRA*. xxvi, 322;—*P. CHINENSIS*, Knight—*P. maritima*, Poiret. xxvi, 316;—*P. CORSICANA*, Hort.—*P. laricis*, Poiret. xxvi, 317;—*P. EXCELSA*, Lam.—*Abies excelsa*, D. C. xxvi, 323.
- FOLIIS LONGISSIMIS*, Cold;—*P. FOLIIS TERNIS*, Gronow—*P. tæda*, L. xxvi, 318;—*P. FRASERI*. xxvi, 315;—*P. GEORGICA*, Hort.—*P. australis*, Mich. xxvi, 318;—*P. HALEPENSIS*, Mill. xxvi, 323;—*P. INSIGNIS*, California. xix, 306; xxvii, 603;—*P. JAPONICA*, Hort.—*P. maritima*, Poiret. xxvi, 316;—*P. LAMBERTIANA*, California. xix, 306; xxvii, 603.
- LARICIS ALTISSIMA*, and *CEBENENSIS*, Hort.—*P. laricis*, Poiret. xxvi, 317;—*P. LARICIS*, Poiretiana. xxvi, 316, 317;—*P. LARIX*, L.—*Larix europæa*, D. C. xxvi, 321;—*P. LONGIFOLIA*, India, descript. Dymock. xxviii, 198.
- MARITIMA*, Poiret. xxiv, 203; xxvi, 316, 438—(of AIT.)—*P. laricis*, Poiret. xxvi, 317;—*P. MARITIMA ALTERA*, C. Bauh.—*P. maritima*, Poiret. xxvi, 316;—*P. MONOPHYLLA*, California. xxvii, 279;—*P. NEGLECTA*, Low;—*P. NEPALENSIS*, Royle—*P. maritima*, Poiret. xxvi, 316;—*P. NIGRICANS*, Hort.—*P. laricis*, Poiret. xxvi, 317;—*P. NOVÆ ZEALANDIÆ*, Hort.;—*P. NOVÆ HOLLANDIÆ*, Lodd.—*P. maritima*, Poiret. xxvi, 316.
- PALMIENSIS*, Gord.;—*P. PALMIERI*, Manetti, = *P. australis*, Mich. xxvi, 318;—*P. PALUSTRIS* = *P. australis*, Mich. xxvi, 318, 438;—*P. PACTINATA*, Lam. = *Abies pectinata*, D. C. xxvi, 313;—*P. PICEA*, L. xxvii, 279; = *Abies pectinata*, D. C. xxvi, 313;—*P. PICEA*, Du Roy. xxii, 163; = *Abies excelsa*, D. C. xxvi, 323;—*P. PINASTER*, Sol. in Ait. — *P. maritima*, Poiret. xxvi, 316;—*P. PONDEROSA*, California. xxvii, 384, 603;—*P. PUMILIO*. xxv, 366; xxvi, 322, 438.
- RELIGIOSA*, Mexico. xxiv, 770;—*P. RESINOSA*, Canada xxv, 338;—*P. SABINIANA*, California. xix, 306; xxvii, 603; its heptane, Thorpe. xxvii, 385;—*P. SANCTA HELLENICA*, Loud.—*P. maritima*, Poiret. xxvi, 316.
- SYLVESTRIS*, L. xxvi, 317, 438;—*P. SYLVESTRIS A COMMUNIS*, Endl. = *P. SYLVESTRIS*, L. xxvi, 317;—*P. SYLVESTRIS MARITIMA CONIIS FIRMITER*, etc., J. Bauh.;—*P. SYLVESTRIS*, B. L.;—*P. SYLVESTRIS*, Mill. = *P. maritima*, Poiret. xxvi, 316;—*P. SYLVESTRIS*, GENEVENSIS, Hort.;—*P. SYLVESTRIS HAGUENENSIS*, Loud. = *P. sylvestris*, L. xxvi, 317;—*P. SYLVESTRIS* var. *MARITIMA*, Ait. — *P. laricis*, Poiret. xxvi, 317;—*P. SYLVESTRIS SCARIOSA*, Lodd;—*P. SYLVESTRIS SQUAMOSA*, Rosc. = *P. sylvestris*, L. xxvi, 317;—*P. SYRTICA*, Thore. = *P. maritima*, Poiret. xxvi, 316;—*P. TÆDA*, L. xxvi, 318, 438;—*P. VIRGINIÆ TENUIFOLIA*, Plukn. = *P. tæda*, L. xxvi, 318;—*TEOCOTE*, Mexico. xxiv, 768, 770;—*P. TORREYANA*, California. xxvii, 279;—*P. TUBERCULATA*, California. xix, 306.
- Pinweed** = *Lechea major*, Kansas. xxix, 441.
- Piper ADUNCUM**. xxiii, 646;—*P. ANGUSTIFOLIUM*. xxiii, 65;—*P. BETEL*, microscop. examin. of leaf, Paschkis. xxx, 247;—*P. CITRIFOLIUM*, physiolog. act., Gubler. xxv, 28, 178;—*P. CUBEBÆ*, see *CUBEBS*;—*P. ELECTRICUM*. xxiv, 162;—*P. JABORANDI*. xxiv, 162; constituents, Parodi. xxiii, 188;—*P. LÆTUM* (false *jaborandi*). xxviii, 167;—*P. LANCEAFOLIUM*. xxiii, 646;—*P. LONGUM*, India. descript., Dymock. xxviii, 191—*P. METHYSTICUM*. xxv, 27, 222, see *KAVA-KAVA*;—*P. NODULOSUM*. xxiv, 162;—*P. RETICULATUM*. xxiv, 162; xxv, 178; physiolog. act., Gubler. xxv, 28, 178;—*P. TRISICUM*, India. xxviii, 192.
- Piper-ethyl-alcamin** and **PIPER-PROPYL-ALCAMIN**, Ladenburg. xxx, 399.
- Piperaceæ**. xviii, 274; xxii, 164; xxiii, 221; xxiv, 197; xxv, 222; xxvi, 297; xxvii, 262; xxviii, 191; xxx, 247.
- Piperidin**, fr. chavicin, Buchheim. xxv, 320—converts. into pyridin, Koenigs. xxviii, 343.
- Piperin**, is cont. in the kernel and not in the skin. xxvi, 619—act. of sulphomolybd. ammon., Buckingham. xxi, 369; of sulph. ac., bichr. pot., chlor. lime, Hamlin, Jr. xxix, 325; of ferric chlor., butt. antimony, stannous chlor., Godeffroy. xxvi, 559; of sulph. ac., ferric chlor., How. xxvi, 561—prep., estimat., Caze-neuve and Caillot. xxvi, 618—prep. and constitution, Buchheim. xxv, 320.
- Piperina**, Arg. Republ. xxiv, 764.
- Piperonal**, Fittig and Mielck. xviii, 260.
- Pipettes**, construct. and verification, Scheibler. xxix, 32.
- , **MINIM**, Drew: Squibb. xxvii, 58.
- Pipi** = a spec. of *Malpighia*, Brazil. xxiii, 121.
- Pipitzahoac** = *Trixis pipitzahoac*, Mexico. xxiv, 775.
- Pipitzuahuala**, Perez. xxiv, 798.
- Pipli** = *Piper longum*, India. xxviii, 191.
- Pippula-moola** = *Piper longum*, India. xxviii, 192.
- Pipybras**—*Scoparia dulcis*, Liberia. xxvi, 169.
- Piquillin**—*Condalia lineata*, Arg. Republ. xxx, 138.
- Piscidia ERYTHRINA**, see *DOGWOOD*, JAMAICA.
- Piscidin**, Nagle. xxix, 222.
- Pisciola PISCUM**, France. xxiii, 231.
- Pissa**—wood tar, France. xxvi, 325.
- Pistacia KHINJUK**, India, descript. of galls, Dymock. xxvi, 163.
- LENTISCUS**. xxvi, 296.
- TEREBINTHUS**, Chios, decoct. of leaves in albuminuria, Landerer. xxvi, 296; xxviii, 188; xxix, 222. See also *TURPENTINE*, CHIAN.
- VERA** xxvi, 296—gall nut (43 p. c. tannin), Turkestan. xxi, 258.
- Pistachio NUTS**, Greece. xxvi, 296.
- Pitch**, synonyms. xxvi, 325—uses in Greece, Landerer. xxvi, 327.
- BLACK**. xxvi, 325.
- BURGUNDY**, very little true to be found. xix, 333—fr. *Abies excelsa*, account, Morel. xxvi, 323—constitution, Maly. xxvi, 324.
- HEMLOCK**, adult. xxiii, 500.
- Pitchapullum**—seeds of *Citrullus vulgaris*, India. xxvii, 229.
- Pitcher plant**—*Sarracenia purpurea*, California. xxvii, 611—use by the Indians in small pox. xxi, 620.
- Pito canuto**, Arg. Republ. xxiv, 764.
- Pitohri** = *Ipomœa turpethum*, India. xxviii, 130.
- Pittacal**, analysis, Grätzel and Liebermann. xxv, 269.
- Pitta-papada** = *Glossocardia Bosvallea*, India. xxvii, 179.
- Pittosporaceæ**. xxi, 234.
- Pittosporum UNDULATUM**, Australia, yield of oil. xxi, 234.
- Pittsburg**, how the pharm. assn. was brought about. xxi, 109—drug market. xxi, 443.
- Piturina**, fr. *Duboisia Hopwoodii* prop., composition, Liveridge. xxix, 339, 340—probably identical with *duboisina*, Müller and Rummel. xxvii, 519—(of Gerrard) is identical with *nicotin*, Petit. xxvii, 162.
- Pitury**—*Duboisia Hopwoodii*, Australia. xxv, 138; xxvii, 162—alkaloid, Gerrard. xxvii, 162—cont. *nicotina*, Petit. xxvii, 162.
- Pix ABIETINA** (Burgundy pitch). xxvi, 323.
- ACRIDA**;—*P. LIQUIDA*;—*P. NAVALIS*;—*P. SICCA*;—*P. SOLIDA*;—*P. VEGETABILIS*. xxvi, 325.
- Placenta**, HUMAN, in consumption, China. xxiv, 760.
- Placodium ELEGANS**, as source of chrysophanic acid. xxv, 65.
- Plants**, cont. alcohol, Gutzeit. xxiv, 287—biennial, proper time of collecting leaves, Maisch. xxi, 621—chemical food. xxx, 137.
- MEDICINAL**, which soon require to be CULTIVATED because of scarcity, Sloan. xxviii, 504—cult. in Lincolnshire, Holmes. xxx, 137; in Nilgherries, Jamieson. xxix, 114; in United States, Sloan. xxviii, 500, 2.

- Plants, distribution, cause, Sloan.** xxviii, 501—**DRIED, preservat. of natural color, Stoelzl.** xxv, 58; xix, 174—**cont. a FERMENT in buds and young leaves, Kosmann.** xxv, 330—**fertilizer, Hogan.** xxv, 115—**cont. a PEPSIN-like ferment, Gorup-Besanez and Will.** xxv, 329—**germination of seeds, Saunders.** xxx, 565—**impressions.** xxvi, 171.
- Plantaginaceæ.** xxiv, 131; xxvi, 202; xxx, 161; of Kansas. xxix, 449.
- Plantago DECUMBENS.** xxvi, 202.
- **ISPAGHULA, India, seeds as demulcent.** xxiv, 131—**account.** xxvi, 202—**in diarrhoea, Turkestan.** xxi, 213.
- **LANCEOLATA, Kansas.** xxix, 449.
- **MAJOR, Kansas.** xxix, 449—**in Malta.** xxvi, 167; —**P. PSYLLIUM, India, uses of seed, Dymock.** xxvi, 159; —**P. VIRGINICA, Kansas.** xxix, 449.
- Plantain, INDIAN-, = Cacalia tuberosa, Kansas.** xxix, 442; —**SNAKE-, = Plantago lanceolata, Kansas.** xxix, 449; —**WATER-, = Alisma plumbago, Kansas.** xxix, 439; —**WHITE-, = Plantago virginica, Kansas.** xxix, 449.
- Plas = Butea frondosa, India.** xxviii, 195.
- Plasma, rational formula, Willmott.** xxvii, 82—**as pill excipient, Hogan.** xxvii, 82.
- Plaster casts (improved by sulph. pot.).** Schott. xix, 204.
- Plaster spreading machine, Glasenapp.** xviii, 205 —**Oberdörffer.** xxviii, 47—**Spencer.** xviii, 204—**Thein (upon paper, and paper on adhesive plaster).** xxix, 67.
- **PERFORATOR, Remington.** xxvi, 94.
- Plasters, CHINESE.** xxii, 32.
- **PH. BRIT., Gerrard.** xxiii, 52.
- **see also TAFFETAS.**
- Plasters, ADHESIVE, brittle restored by turpentine, Facilides.** xxi, 176—**Ph. Germ. (object. to oleic ac. of commerce), Hager; Dieterich.** xxii, 80.
- **ADHESIVE, ELASTIC, Morgan.** xxvii, 74; xxix, 67.
- **ADHESIVE, LIQUID, Enz.** xxi, 176.
- **ADHESIVE, SUBSTITUTE (glue in acet. ac.), Hewson.** xxix, 67.
- **BOYNTON.** xxvii, 74; xxix, 67; xxx, 67.
- **CANTHARIDES, Dragendorff.** xxi, 144—**(Gerrard.** xxv, 62—**strangury prevented (by bicarbon. sod. dusted over), Dannecy.** xxvii, 74. **See also CERATE and OINTMENT.**
- **CAOUTCHOUC, Worthington.** xix, 158.
- **CHLORAL, Solari.** xxvii, 75.
- **CINNABAR, Vidal.** xxviii, 48.
- **ELASTIC, Morgan.** xxvii, 74; xxix, 67.
- **GELATIN, FLEXIBLE, Rittenhouse.** xxi, 604; xxii, 81.
- **ISINGLASS.** xxv, 70.
- **LEAD, antiquity.** xxv, 476—**prep., Bernbeck.** xxx, 70; **Gerrard.** xxiii, 53; **Neynaber.** xxix, 67; **Redwood.** xxiii, 53; **Umney.** xxiii, 53.
- **MUSTARD, Dieterich.** xxviii, 45.
- **PITCH, Greece (on old wine—goat skins).** xxix, 68.
- **TAR, Gerrard.** xxiii, 53; **Murray.** xxvi, 94; **Ph Hannover.** xxvi, 95; **Van Mons.** xxvi, 95. **See also EMPLASTRUM.**
- Platanaceæ, Kansas.** xxix, 449.
- Platanus OCCIDENTALIS, Kansas.** xxix, 449.
- Platinizing, glass, porcelain, stone ware, Boettger.** xviii, 242 —**metallic vessels, Hager.** xxx, 56.
- Platinum.** xviii, 242; xix, 211; xxi, 318; xxii, 208; xxiii, 313; xxiv, 266; xxvi, 425; xxvii, 374; xxviii, 255; xxix, 281; xxx, 311; in California. xxvii, 596; Lapland. xix, 211.
- Platinum GROUP, peculiarities, Matthey.** xxvii, 375.
- **attacked by fusing alkaline carbonates, Koninck.** xxix, 282—**act of oxygen, Deville and Debray.** xxvii, 374; **of fire, Rémont.** xxx, 311; **of sulph. ac. in presence of nitrogenous compd., Scheurer-Kester.** xxix, 243—**extraction fr. ore, Opificius.** xxvi, 425; **(bromine), Wagner.** xxiv, 218—**reduced by chloral.** xix, 246; **sod. formiate, Du villier.** xxviii, 255—**convers. of residues into chlorides, Kösel.** xxii, 208—**silicium imparts great brittleness, Reichardt.** xxiii, 313—**solubility in sulph. ac., Scheurer-Kestner.** xxiv, 214—**spec. grav., Deville,** xxiv, 266—**temp. of**
- Platinum (Continued.)**
- **reduct. by hydrogen, Muller.** xix, 138—**volatility in chlorine gas, Seelheim.** xxviii, 255—**SALTS, act. of trimethylamin, Vincent.** xxv, 316.
- **ALLOYS, sp. gr., Deville and Debray.** xxiv, 266.
- **BLACK, Boettger.** xxviii, 256; **Smith.** xxi, 128; **Zdrawkowitsch.** xxiv, 267.
- **VESSELS, gold plated, Smith.** xxiii, 35—**American make, Reynor.** xxi, 126.
- **WIRE is more tenacious if dust be excluded during the drawing, Gaiffe.** xxvi, 426.
- Platinum and AMMON. SULPHOCYANIDE, Skey.** xxiii, 267.
- **BICHLORIDE fr. residues, Krause.** xxiii, 313; **Vulpius.** xxiii, 314.
- **BROMIDE, Meyer and Züblin.** xxix, 282.
- **CHLORIDE, contamin. by chloride gold, Gintl.** xxix, 282—**cost of home-made.** xx, 206—**reduced by magnesium.** xix, 205—**is not reduced by formiate of sod., Boettger.** xxi, 318—**solubility in anhydrous ether, Skey.** xxvi, 477—**prep., Thomson.** xxvi, 427.
- **HYDRATE, Thomson.** xxvi, 427.
- **compound with TIN and oxygen, Delachanal and Mermet.** xxiv, 267.
- Platycodon GRANDIFLORUM, China.** xxiv, 746—**Japan, descript., Holmes.** xxviii, 142.
- Plectranthus PATCHOULI and P. FRUTICOSUS.** xxix, 148.
- Plegorrhiza ASTRINGENS, Chili.** xxvii, 155.
- Pleurisy root. See ASCLEPIAS TUBEROSA.**
- Pleurogyne ROTATA, Japan.** xxviii, 100—**descript., Holmes.** xxviii, 135.
- Plum KERNELS, yield of amygdalin.** xxiii, 437.
- **LEAVES, p. c. of ash.** xxii, 137.
- Plumbago ROSEA, India, descript., Dymock.** xxv, 134; —**P. SCANDENS, Mexico.** xxiv, 772; —**P. ZEYLANICA, India, descript., Dymock.** xxviii, 118.
- Plumbaginaceæ.** xxiii, 148; xxv, 134; xxvii, 153; xxviii, 118; of California. xix, 304; Mexico. xxiv, 772.
- Plumbo-nitrate glyceride, Morawski.** xxx, 359.
- Plumbum. See LEAD.**
- Pluton cañon, California.** xxvii, 617.
- Po' de Bahia = Araroba.** xxiii, 213.
- Poa ANNUA, ergot, Wilson.** xxiv, 120; —**P. CYNOSURIODES, India, Dymock.** xxvi, 161; —**P. PRATENSIS, ergot, Wilson.** xxiv, 120.
- Pocket cases for PHYSICIANS, Squibb.** xxi, 542.
- Podocarpus CUPRESSINA var. IMBRICATA, cont. podocarpinic ac., Oudemans, Jr.** xxii, 253—**resin, behav. to reagents, Hirschsohn.** xxvi, 453-9.
- Podophyllin, activity diminished by alkalies.** xxv, 425—**causes of variable color, Senier and Lowe.** xxvi, 136; **Lloyd.** xxvi, 767; **discussion.** xxv, 560; xxvi, 896—**commercial examinat., Beach.** xxiv, 412; xxv, 96; **Guareschi.** xxix, 192—**constituents, Bush.** xxvi, 251—**cont. podophyllinic ac., Buchheim.** xxii, 125—**PREPARATION: Feil.** xxviii, 64; **Klie.** xxvi, 135; **Lloyd.** xxvi, 899; xxviii, 64 — **solubility, Biddle.** xxviii, 165; **Maisch.** xxii, 126; **Parker.** xxx, 128—**blunts the taste.** xxix, 193.
- Podophyllotoxin, Podwissotski.** xxix, 191.
- Podophyllum, adult. of powder.** xxx, 576—**examin. of root at diff. periods of growth, Biddle.** xxviii, 165 — **active principle an anhydrid of an acid, Buchheim.** xxii, 34—**active principle, Hodgson, Jr.** xxv, 425; **Mayer.** xxv, 426—**analysis, Podwissotski.** xxix, 191—**resin soluble in ether is the only active constituent, Power.** xxii, 126—**cont. no berberina, Maisch.** xxviii, 166; **Power.** xxv, 425, 431; xxvii, 205—**in cultivation requires shade.** xxviii, 503—**therapeut. act. suppressed by lactic acid, Schafer.** xx, 225—**microscop. struct. of rhizome, Power.** xxv, 421 — **protocatechuic ac. (xxv, 427, 433) does not pre-exist, Power.** xxvii, 205—**resin analyzed, Power.** xxv, 420—**is not attacked by Tinea zeae, Saunders.** xxi, 627—**eighty years ago.** xxvi, 849.
- **PELTATUM, Canada.** xxv, 335; **Kansas.** xxix, 440.
- Poecone (1610) = Lithospermum canescens.** xix, 492.

- Pogostemon PATCHOULY**, see PATCHOULY.
 — **PURPURICAULIS**, India, *descript.*, Dymock. xxv, 143.
Pogogyne DOUGLASSII;—**P. SERPYLLOIDES**, California. xix, 304.
Poho essence=oil of *Mentha javanica*. xxviii, 266.
Poinciana PULCHERRIMA, India, *descript.*, Dymock. xxvi, 166.
Poisons, METALLIC, antidote, Nietsch. xxix, 86.
 — fr. **CADAVERS** used in Australia. xxvii, 522.
 — **VEGETABLE**, chlorof best adapted to recover them fr. *solut.*, Nowak. xxi, 367.
Poisons, DISPENSING (dilute with sugar of milk), Bibby. xxiv, 62—precautions, Bakes. xix, 436.
 — relations between constitution and physiological effects, Crum Brown; Frazer. xviii, 292.
 — **KEEPING**, resolution of Am. Med. Assn. xxi, 445; Philadelphia College of Pharmacy. xx, 34; Eberle. xxi, 575—**CABINET**, Duffield. xviii, 194; Holbe. xxvi, 88.
 — for **VERMIN** (sulpho-glycero-carbolate of nicotin), Wilson. xxviii, 91.
Poison Oak, see also **RHUS TOXICODENDRON**.
 — eruptions, use of *Grindelia robusta*, Steele. xxiii, 643—*Ambrosia artemisiifolia*. xxviii, 102—*Rhus diversiloba*. xxvii, 610, 2.
Poison, Ordeal-, of **GABOON** (alkaloid diff. fr. strychn. and brucia, and quickly eliminated), Rabuteau and Peyre. xix, 286.
Poix BLANCHE;—**P. JAUNE**—Burgundy pitch, France. xxvi, 323;—**P. LIQUIDE**—wood tar;—**P. NAVALE**—Pitch;—**P. NOIR**—Pitch. xxvi, 325;—**P. DES VOSGES**—Burgundy pitch. xxvi, 323.
Pokaho—*Elæocarpus Hookerianus*, New Zealand. xxiv, 737.
Poke root, see **PHYTOLACCA DECANDRA**.
Pokli root, a spec. of *Urticacea*, India, *descript.*, Dymock. xxvi, 164.
 — **miri**—abortive pepper-corns, *Piper trisicum*, India, *descript.*, Dymock. xxviii, 192.
Polanisia GRAVEOLENS, Kansas. xxix, 441;—**P. ICOSANDRA**, India, *descript.*, Dymock. xxv, 165.
Polarimeter, used in pharmacy, Symes. xxviii, 38.
Polarized light, appl. in pharmacy, Pocklington. xxiv, 312.
Poleo, Arg. Republ. xxiv, 763.
Polemoniaceæ of California. xix, 304; Mexico. xxiv, 773.
Polemonium CÆRULEUM, Calif. xix, 304;—**P. REPTANS** in Ohio. xxviii, 503.
Polishing cloth for brass, Reichardt. xxiii, 113.
Polisone—*Crinodendron Hookerianum*, Chili. xxiv, 765.
Pollante—*Lycopodium paniculatum*, Chili. xxiv, 765.
Polyaceton, Heintz. xxii, 229.
Polygala BOYKINII, Alabama, *therapeut. value*, Gunn. xxx, 226—entitled to be called a species, Maisch. xxx, 226—account. xxix, 522.
 — **NUTKANA**, California. xix, 300;—**P. PAUCIFOLIA**, root cont. salicylic ac. xxiii, 747;—**P. QUIDIVIDIS**, Chili. xxiv, 766.
 — **SENEGA**, Kansas. xxix, 449;—**var. LATIFOLIA**. xxix, 454.
Polygalaceæ. xviii, 289; xxiv, 176; xxvii, 214; xxx, 224; of California. xix, 300; Kansas. xxix, 449.
Polygonaceæ. xix, 291; xxi, 211; xxii, 102; xxiii, 145; xxiv, 129; xxv, 132; xxvi, 196; xxvii, 147; xxviii, 117; xxix, 135; xxx, 156; of California. xix, 305; Kansas. xxix, 449.
Polygonatum MULTIFLORUM, Kansas. xxix, 447.
Polygonum AMPHIBIUM, yield of tannin, Aughey. xxiv, 129—Kansas. xxix, 449.
 — **AVICULARE**, in gravel, Jackson. xxii, 102—Kansas. xxix, 449.
 — **CONVOLVULUS**, seeds in Black Sea linseed, Holmes. xxx, 216—Kansas. xxix, 449.
 — **HYDROPIPER**, active principle, Rademaker. xxi, 137—Kansas. xxix, 449;—**P. HYDROPIPEROIDES**, Kansas. xxix, 449.
 — **PERSICARIA**, seeds in English linseed, Holmes. xxx, 215—Kansas. xxix, 449.
Polygonum PUNCTATUM, in dysentery, Woodward. xxvii, 147.
 — **TINCTORUM**, yields indigo, Schunk. xxvi, 623;—**P. VIRGATUM**, Chili. xxiv, 765;—**P. VIRGINICUM**, Kansas. xxix, 449.
Polyhalite, Stassfurt. xxii, 186.
Polymnia CANADENSIS, Kansas. xxix, 442.
 — **UVEDALIA**, in ague cake, Clowes. xxvii, 178—Kansas. xxix, 442.
Polynemus SELE, yield E. India isinglass. xxii, 172.
Polypodium CALAGUALA, Mexico. xxiv, 769;—**P. CALIFORNICA**. xix, 307;—**P. INCANUM**, Kansas. xxix, 445;—**P. LANCEOLATUM**, Mexico. xxiv, 763;—**P. PHYMATODES**, Mauritius. xxiv, 741; Siberia. xxvii, 136;—**P. PSEUDO FILIX-MAS**, Mexico. xxiv, 769;—**P. QUERCIFOLIUM**, India, *descript.*, Dymock. xxvi, 158;—**P. SCOLERI**, California. xix, 307;—**P. VULGARE**, India, *descript.*, Dymock. xxvi, 159.
Polyporus BETULINUS, cont. oxalic ac., Hamlet and Plowright. xxvi, 178.
 — **OFFICINALIS**. See also **AGARIC**.—*examin. of resin*, Masing. xxiii, 122—India, *descript.*, Dymock. xxvi, 162.
 — **FARINELLUS**, cont. oxalic ac., Hamlet and Plowright. xxvi, 178;—**P. PURPURASCENS**, cont. polyporic ac., Stahlschmidt. xxvii, 477—**P. RUBESCENS**; **P. SULPHUREUS**, cont. oxal. ac., Hamlet and Plowright. xxvi, 178.
Polytrichum CORIACEUM, Chili. xxiv, 766;—**P. JUNIPERINUM**, California. xix, 308.
Pomade (POMATUM).
 — **PARAFFIN**, Lemberger. xxiii, 629.
 — **RUSCI** (birch tar). xxix, 63.
 — **TAR**, Hebra. xxix, 235.
Pomades, PERFUMERY, how to treat for extracts, Saunders. xxiv, 499—"No. 240" of Roure-Bertrand fils, France. xxiv, 824.
Pomegranate, commercial root bark is chiefly trunkbark, Harz. xix, 275—true rootbark is very efficacious, Vrij. xxiii, 207—alkaloids, Tanret. xxvi, 280; four alkaloids. xxviii, 176, 384—yield of pelletierina, Tanret. xxvii, 518.
Pond lilly, YELLOW—*Nuphar advena*, use by Indians. xxi, 619.
Pongamia GLABRA, India, fruit for cough. xxiii, 120.
Ponna-virai—*Cassia sophora*, India. xxvi, 166.
Ponsælion, prep., Thomson. xxvi, 364; xxviii, 254.
Pootatanni-maram—*Careya arborea*, India. xxvii, 236.
Poplar BARK, adult. of powd. xxx, 576.
 — **BUDS**, constituents, Picard. xxii, 162.
Poppy. See also **PAPAYER** and **OPIUM**.
 — **FLOWERS**, red, loss in drying. xxi, 202.
 — **HEADS** cont. codeia, morphia, narcotina, narceia, Groves. xxx, 227; Krause. xxiii, 198—cont. no morphia when perfectly ripe. xxi, 243; Wittstein. xxiii, 198—powdering by hand. xxiii, 597—comparat. value of Oriental with German, Jobst. xxi, 240—**CULTIVATION**: Australia, Hood. xix, 265; at Banbury, England, Holmes. xxv, 191; China. xix, 264; Germany. xxi, 241; Jobst. xviii, 290; xix, 265; xxi, 240; Schneider. xxi, 240; yield in Germany, Merck. xxi, 241; Pennsylvania, Kennedy. xix, 264; Silesia. xxi, 241; Württemberg, Jobst. xix, 265, xxi, 240.
 — **PRICKLY**—*Argemone Mexicana*, Kansas. xxix, 448.
Populin, artificial fr. salicin, Schiff. xix, 257.
Populus ANGULATA, Kansas. xxix, 450;—**P. ANGUSTIFOLIA**;—**P. MONILIFERA**, California. xix, 306;—**P. NIGRA**, cont. a ferment in young leaves and buds, Kosmann. xxv, 30, 330;—**P. SPINOSA**, China. xxiv, 756.
Porcelain vessels, cracked, repaired, Walzl. xix, 170—black paint (iridium oxide). xviii, 242—platinized, Boettger. xviii, 242.
Porotillo, Arg. Republ. xxiv, 762.
Porphyrin, in *Alstonia constricta*, Hesse. xxvii, 174; xxix, 155.
Porphyroxin (fr. **OPIUM**) is a complex body, Hesse. xviii, 262—history. xxi, 374—fr. **SANGUINARIA**, Carpenter. xxvii, 223.

- Portraits. xxii, 520—desirability for the "Proceedings," Maisch. xxii, 476.
- Portraits: *Andrews, Geo. Wansay.* xxx.
Badger, Charles W. xxix.
Bringham, Ferris. xxvi.
Carney, Ch. T. xxv.
Chapman, W. B. xxvii.
Milhan, John. xxiv.
Parrish, Edward. xxiii.
Procter, Jr., William. xxii.
- Portulaca OLERACEA*, Chili. xxiv, 765—Kansas. xxix, 449—Turkestan. xxi, 244.
- *QUADRIFIDA*, India, descript., Dymock. xxvi, 165.
- Portulacaceæ*. xxi, 244; of California. xix, 299; Kansas. xxix, 449.
- Portugal, pharmacy. xix, 317—pharm. prep., Centennial exhibit. xxiv, 815.
- Poskar—a spec. of *Lingularia*, India. xxvi, 226.
- Posidonia OCEANICA*, analysis, Sestini. xxiii, 121.
- Potalia AMARA*, Guiana, analysis, Heckel and Haller. xxv, 148.
- Potash, see also POTASSIUM CARBONATE.
- commercial, analysis, Corenwinder and Contamine. xxviii, 232—deposits, Stassfurt. xxii, 185; xxvi, 373.
- , "BALL"—, cont. no potash but soda, Menzies. xxix, 92.
- , "ROCK"—, cont. no potash but soda, Menzies. xxix, 92.
- Potassa ESTIMAT., Carnot. xxv, 252; xxvii, 324; (at Stassfurt), Krause. xxiii, 268; Mohr. xxii, 185; Steiner. xxiii, 268; (in minerals), Knop and Hazard. xxvii, 327; (in presence of soda), Schlickum. xxviii, 233—PREP. fr. chloride, pot., Grüneberg and Vorster. xxv, 254; fr. nitrate pot., Polacci. xxi, 288; xxv, 253—separat. fr. soda in analysis, Fahlberg. xxi, 289; Schlössing. xxi, 289; fr. alkaline earths, Pfeiffer. xxvii, 327—solubility in ether, Skey. xxvi, 477.
- Potassium. xviii, 228; xix, 197; xxi, 288; xxii, 185; xxiii, 268; xxiv, 234; xxv, 252; xxvi, 373; xxvii, 323; xxviii, 232; xxix, 256; xxx, 287.
- is not ignited by strong alcohol, Vogel. xxii, 225—lustre, to keep, Erkmann. xxvii, 323—act. upon bisulphide carbon, Edison. xxvi, 366—salts, TEST: Koninck; Curtman. xxx, 287; Stolba. xxiv, 234—proper doses, Hager. xxviii, 233—solub. in water, Löhle. xxix, 256.
- ACETATE, cost of home made. xx, 20—fluid volume, Candidus. xxvii, 709—soluble in alc., Candidus. xxx, 565.
- AMIDOSULPHONATE, Berglund. xxvii, 331.
- BICARBONATE, fluid volume, Candidus. xxvii, 709—solub. in alc., Candidus. xxx, 565; in water, Dibbits. xxix, 235.
- BICHROMATE, is a neutral salt, Mohr. xxi, 363—drug market. xxi, 431; xxvii, 560, 567, 8, 9—fluid volume, Candidus. xxvii, 709.
- BITARTRATE, adult. xix, 343; xxi, 486, 490, 2; xxii, 314; xxiv, 403; xxv, 458; (77 p. c. alum), Merrick. xxi, 492; (99 p. c. gypsum), Royse. xxiv, 409; (64 gyps., 16 sulph. pot.), Stone. xxvi, 546; (rice flour), Sharples. xxiii, 516—always contaminated with lead, Mirus. xviii, 260; with tartrate calc. is unavoidable, Paul. xxviii, 312—in California. xxvii, 620—exam. of commercial, Royse. xxiv, 409—drug market. xix, 398; xxi, 429; xxv, 351; xxvi, 653; xxvii, 558, 560, 567, 569, 573; xxviii, 370; xxix, 372, xxx, 466—for grocers (6 tart. ac., 94 terra alba), Sheppard. xxv, 569—estimat. of lead, Steudeman. xix, 198—insoluble in dilut. alc. xxviii, 233—solubility in water; dilut. alc., Kissel. xix, 197; in water, Warrington. xxiv, 334; Portele and v. Babo. xxviii, 313—manuf. in United States. xxviii, 313.
- BOROCITRATE (mono-, di-, tri-), Scheibe. xxviii, 316; xxix, 321.
- BORODISALICYLATE, Jahns. xxvi, 539.
- BORO-FLUORIDE, Stolba. xxiv, 234—as a flux, Stolba. xxvii, 314.
- BROMIDE, act. of peroxide hydrogen, Schöne. xxvii, 292—adult., Adrian. xviii, 230—is generally alkaline, Chase. xxi, 148—contamin. (chloride pot.), Smith. xxi, 497; (lead), Maschke. xxix, 249—test for pot. chloride, Falières. xxi, 290; Hager.
- Potassium. (Continued.)
- xxi, 291; xxviii, 221; Roth. xxix, 249—test for iodide pot., Hager. xxi, 291; xxviii, 221—drug market. xx, 116; xxii, 623; xxvii, 560, 8, 9; xxx, 470—fluid volume, Candidus. xxvii, 709—freed fr. iodide pot., Baudrimont. xviii, 229—better to purify the crude materials instead of the finished product, Falières. xxi, 290—solubility in alc., Candidus. xxx, 565—French is generally impure, Adrian. xxi, 497.
- BROMOPLATINITE, Thomsen. xxvi, 427.
- CANTHARIDATE, activity compared to an ordinary blister, Squibb. xx, 61—prep., yield, Delpech. xviii, 291—by dialyzing, Dieterich. xxviii, 350—for plaster. xix, 164.
- CARBOLATE yields paraoxybenzoic ac. with carbon. ac. and not salicylic ac., Kolbe. xxiii, 375.
- CARBONATE, see also POTASH—fluid volume, Candidus. xxvii, 709—fr. residue of beet sugar molasses, xxi, 292—fr. chloride pot., Engel. xxix, 256—fr. sulphide, Siermann. xxviii, 234—fr. trimethylamin. xxviii, 233—pure fr. pot. bitartrate, Siebold. xxiv, 234; fr. nit. pot. and oxalic ac., Smith. xxiii, 269—solubility in ether, Skey. xxvi, 477.
- CHLORATE, adult. (15 p. c. bicarb. pot.), Bruylants. xxi, 497—alkaline react. after heating to redness. xxvii, 324; (denied by Hager. xxvii, 325)—contamin. with lead, Hilger. xxiii, 270, 518; xxiv, 235—granulated contamin. with manganese, Godeffroy. xxi, 497; xxii, 185—drug market. xix, 396; xx, 116; xxi, 431; xxii, 639; xxvii, 560, 567, 8, 9—fluid volume, Candidus. xxvii, 709—iridescent. xxiv, 785—explodes phosphorus in bisulphide carbon., Moigno. xxi, 292—in pills (manna), Fairthorne. xxx, 101—poisonous, Kennedy. xxvi, 374—recrystallization, Lindemeyer. xxiii, 269—solubility in alcohol, Candidus. xxx, 565.
- CHLORIDE, act. of peroxide hydrogen, Schöne. xxvii, 292—a well-defined compound with sugar, Violette. xxii, 247.
- CHLOROPLATINITE, Thomsen. xxvi, 426.
- CHROMATE (yellow), absorbs carbonic acid gas, Fleischer and Mohr. xxi, 303.
- CHROMOCYANIDE, Moissan. xxx, 286.
- CITRATE, fluid volume, Candidus. xxviii, 420.
- CRESYL-SULPHATE, synthetically, Baumann. xxv, 279—normal constituent of horse urine. xxv, 279.
- CUPROCYANIDE, Vidau. xxiv, 233.
- CYANATE, Bell. xxiv, 232.
- CYANIDE, comp. of black body formed during its preparation, Terreil. xxvi, 367—prep. (format. of cyanate is prevented by substit. metallic potassium for pot. carb.), Erlenmeyer. xxv, 251—pure, Loughlin. xxiii, 266—act. of permangan. pot. (urea), Baudrimont. xxviii, 232; xxix, 254.
- ELEMENT, Bruylants. xxvi, 467.
- FERRATE. xviii, 234.
- FERRICYANIDE (red), act. upon morphia, Polstorff. xxviii, 322—PREPARATION: (bromine for chlorine), Reichardt. xviii, 261; xix, 197; Wagner. xxiv, 218; (bichrom. pot., ferroc. pot.), Wenzell. xix, 197; (mur. ac., chlorin. lime), Rhien. xxi, 287; (peroxide lead), Seuberlich. xxix, 255—reduced to ferroc. by platinum foil, Böttger. xxi, 288.
- FERROCYNIDE (yellow), in analysis (chlor. estimate and as acidimetric test), Bong. xxvi, 368—fluid volume, Candidus. xxvii, 709—limit of copper and iron react., Wagner. xxx, 286—preparation (fr. sulphoc. ammon. of gas works), Alander. xxvi, 568; (by means of nitrogen and carbonic oxide), Deias. xxi, 287; fr. suint (wool fat). xxi, 287.
- FLUORIDE, value in rheumatism and drunkenness, Costa. xxx, 278.
- HYPOIODITE, as test for magnesium, Schlagdenhauffen. xxviii, 238.
- IODATE (fr. iodide and chlorate pot.), Stas. xviii, 229; xix, 189—converts. into iodide by iron filings. Pellagri. xxiv, 219.
- IODINE, act. of light and air, Hager. xxv, 253; of ozone, Houzeau. xxi, 271; of peroxide hy-

Potassium. (Continued.)

- drogen, Schöne. xxvii, 292; of direct sunlight upon solution, Löw. xviii, 229—act. upon bismuth. subnitrate, Woodman and Tidy. xix, 219—taste best covered by coffee, Calor. xxii, 88—ADULT. xix, 345; (58 p. c. bromide; 10 p. c. chlor.), Puy. xxvii, 311; Rice. xxi, 497; Tschirner. xxv, 355—is generally alkaline, Chase. xxi, 148; cont. up to 5 p. c. pot. carbon., Burt. xxiv, 220, 411—contamin. with 10 p. c. iodate, Stoddart. xxii, 316—decomp. by passing through a filter cont. manganese, Müller. xviii, 228—estimat. (corros. sublimate) Marozeau and Personne. xxiii, 249—all DETECTION of pot. bromide unreliable, Rice. xxi, 496 (alcohol) Lepage. xxviii, 223; (conc. sol. brom. pot.), Melckebecke. xxi, 148 (the most reliable, Biltz. xxiv, 219); (corrosive subl.), Jandousch. xxviii, 222; Lepage. xxi, 291; (silver nitrate), Austrian Ph. xxviii, 223—detect. of iodate (pyrogall. ac.), Jacquemin. xxii, 182; (tartaric ac.), Schering. xix, 191—drug market. xx, 116; xxi, 430; xxii, 636; xxvi, 656; xxvii, 560, 567, 8, 9; xxx, 470—fluid-volume, Candidus. xxvii, 709—hypodermic solut., Powers. xxvii, 93—manufact. Schering. xxvii, 310—preparation: Pellagri. xxv, 253; condit. for obtaining porcelain-like crystals, Schering. xxvii, 311; neutral, Groves. xxii, 181—solubility in alcohol, Candidus. xxx, 565; in glycerin, Farley. xxvii, 285—test of purity, Schneider. xxx, 276.
- IODO-HYDRARGYRATE, as test for glucose, Sachse. xxv, 288.
- ISOVALERIANATE, Schmidt. xxvii, 457.
- and MERCURY SELENO-CYANIDE, Cameron and Davy. xxx, 270.
- MORPHINATE, Chastaing. xxx, 401.
- NICOTINATE, Laiblin. xxviii, 343.
- NITRATE, see also SALTPETRE—account of manufact. in Germany. xxiv, 788—contamin. with 20 p. c. chloride, Bullock. xxv, 354—fluid volume, Candidus. xxvii, 709—pure fr. commercial, Siebold. xxiv, 235—solubility in alcohol, Candidus. xxx, 565.
- NITRITE, prep., Persoz (copper, nitrate pot.). xxvi, 342; (is the best process), Müller and Pauly. xxvii, 297.
- OXALATE, solubility in water, Nichols. xix, 197—neutral, Shuttleworth. xxx, 379.
- PERCHLORATE, solubility in water, Pattison. xxiv, 235.
- PERMANGANATE, and alcohol, dangerous. xxiii, 287—behavior to alkaline solutions, Mohr. xix, 216; to conc. sulphur. acid, Spiess. xix, 216—PER- vs. BI-manganate, Maumené. xxiii, 287—decomp., Morawski and Stingle. xxvii, 346—as disinfectant. xix, 166—fluid volume, Candidus. xxviii, 420—efficacy, administ. internally, doubted, Rand. xix, 197—preparation, fr. pot. mangan. and bromine, Wagner. xxiv, 218; (carbonic ac.), Siebold. xxiv, 244—prismatic character wanting, Remington xxi, 298—prop., Rammelsberg. xxiii, 286.
- PHENYLSULPHATE, normal constituent of human urine. xxv, 279—synthetically, Baumann. xxv, 279.
- QUERCITRIN-, Liebermann and Hamburger. xxviii, 344.
- RESORCIN-SULPHATE, Baumann. xxv, 279.
- RICINOLEATE, Giffard. xxvi, 145; xxvii, 101.
- SALICYLATE, physiolog. effect, James. xxix, 314—long exposure to air to be avoided, Penny-packer. xxvi, 542.
- SALICYLATE, ACID, Hoffmann. xxvi, 541.
- SELENO-CYANIDE and MERCURY BROMIDE;—and MERCURY CHLORIDE;—and MERCURY CYANIDE;—and MERCURY IODIDE;—and MERCURY SULPHO-CYANIDE, Cameron and Davy. xxx, 269, 270.
- SILICATE, see also WATER-GLASS—containing 30 p. c. potash, Boissy and Berthelot. xxiii, 257—solut., Phar. Soc. Paris. xxvi, 361.
- and SODIUM BORATE (so-called), as preservative, Jannarch. xxviii, 90.
- and SODIUM TARTRATE, see SODIUM and POTASSIUM TARTRATE.
- SULPHATE, dangerous contamination, Cheval-

Potassium. (Continued.)

- lier. xxi, 497—freed fr. sod. sulph., Sontag. xxi, 292—fluid volume, Candidus. xxvii, 709—solubility in alcohol, Candidus. xxx, 565.
- SULPHIDE, fluid volume, Candidus. xxvii, 709—solub. in glyc., Farley. xxviii, 285.
- SULPHO CARBONATE, dissociated in pres. of ammonia, Rommier. xxiv, 231—prep., prop., Maisch. xxvii, 317.
- SULPHOCYANIDE, limit of iron react. Wagner. xxx, 286—prep., Skey. xxi, 288—produces greatest cold, Kündorff. xxii, 53, 185.
- TARTRANTIMONITE (=tartar emetic), Clarke and Stalls. xxix, 318.
- TARTRATE, freed fr. tartrate of lime, Neynaber. xxv, 296.
- XANTHATE, as antiseptic, Zoeller. xxvi, 551.
- XANTHOGENATE, limit of copper and silver reactions, Wagner. xxx, 286.
- Potatoes, analysis of ashes of diseased and sound, Wilson. xxii, 105—germinating, injurious to health, Bach. xxii, 106—leucin and tyrosin found in tubers, Schulze and Barbieri. xxviii, 120—solania in epidermis and sprouts, Bach. xxii, 106.
- WILD=*Ipomæa pandurata*, Kansas. xxix, 443.
- Potato-bug, Colorado, probably contain cantharidin. xx, 88; (denied by Dembinski. xxvi, 331.)
- Potentilla, review of genus, Maisch. xxiii, 210.
- CANADENSIS;—P. NORVEGICA, Kansas. xxix, 450;—P. GLANDULOSA;—P. RIVALIS, California. xix, 301.
- Potion ANTISPASMODIQUE OPIACÉE. xxv, 93.
- Potiron=*Cucurbita maxima*, France. xxvii, 229.
- Potteries, California. xxvii, 635.
- Poultices in the ORIENT, Landerer. xxiv, 63.
- CAVIAR and FLAXSEED. xxiv, 65;—P. FLAXSEED-MEAL, rational way of making, Brunton. xxvii, 65;—for GOUT, Troussseau. xxvii, 66;—WADDING and IRISH MOSS, Lelièvre. xxiii, 44; xxv, 60;—POKE-ROOT, Hooper. xxv, 61;—TEA, in erysipelas, Vail. xxvi, 65.
- Poutargue, Turkey. xxiv, 780.
- Pouzolzia TUBEROSA, Japan. xxviii, 196.
- Powdering APPARATUS. xxv, 48. See also DRUG MILLS.
- Powders adult., general remarks. xix, 331; xxx, 574, 654.
- CHINESE. xxii, 32.
- VEGETABLE, knowledge of structural elements indispensable for examinat., Lenz. xxx, 238—preserved (over unslaked lime), Cornélis. xxii, 81.
- WAFERS, see WAFER CAPSULES.
- Powder (PULVIS).
- ANTI-ASTHMATIC. xxx, 106.
- ANTISEPTIC, Bruns. xxix, 90; Markoe. xxi, 520.
- AROMATIC, Lemberger. xxi, 588; xxii, 82.
- CAMPHOR, Vosburgh. xxx, 102.
- CHALK, AROMATIC, Ph. Brit., cause of variable color, Patterson. xxii, 82.
- CHALK; AROMATIC, WITH OPIUM, Ph. Brit., Shuttleworth. xxiv, 181.
- DOVERS, valuation, Prescott. xxvii, 102; Stewart. xxv, 192—of French codex (1880). xxx, 102—Ph. Brit., Shuttleworth. xxiv, 181—of several pharmacopœias, Squire. xxx, 102—pill, excipient (manna), Fairthorne. xxx, 101.
- DOVER'S CAMPHORATED, Ives. xxvii, 103—Vosburgh. xxx, 102.
- DOVER'S SACCHARATED, Piffard. xxvi, 134.
- EFFERVESCENT, ROCHELLE and EPSOM SALT, Fairthorne. xxx, 103.
- DUSTING, for FERT, Paulke. xxiv, 97; xxix, 91—INFANTS, Klamann. xxx, 106.
- FUMIGATING. Boutigny. xxvi, 134.
- GIANT, California. xxvii, 637.
- GUN-, see GUNPOWDER.
- HERCULES-, California. xxvii, 636.
- IPECAC. ET OPII. See POWD., DOVER'S.
- KINO COMP., Ph. Brit., Shuttleworth. xxiv, 181.
- LICORICE, AROMATIC, Wilder. xxx, 102.
- LICORICE COMPOUND, Philadelphia Hospital. xxiv, 96.
- OPIUM COMP., Ph. Brit., Shuttleworth. xxiv, 181.

- Powder PHOSPHORESCENT.** xxviii, 211.
 — **POTTER'S.** xxvii, 105.
 — **SEIDLITZ**, examinat. of commercial, Grassly. xx, 273—method of assay, Grassly. xx, 278—weighing or measuring, Grassly. xx, 275—addition of tart. emet., Pile. xx, 90—addition of muriate ammonium, Kempf. xxix, 90.
 — **SEIDLITZ, MACHINE**, Doane. xxvi, 133.
 — **SENNA COMPD.**, Blackwell. xxix, 90.
 — **SODA COMP.**, Philadelphia Hospital. xxiv, 96.
 — **STERNUTATORIUS.** xxv, 142.
 — **TULLY'S**, eight formulas. xxvii, 104.
 — **VULCAN**, California. xxvii, 637.
Power, Fred. B. *Asarum canadense*, analysis. xxviii, 464—resin of *Podophyllum peltatum*. xxv, 420.
Powers and Weightman, statistic of manufacture. xxiv, 537.
Prangos PABULIARIA, India. xxvii, 192; descript., Dymock. xxvi, 158.
Precipitates, separation in quantitat. analysis (asbestos cloth), Gooch. xxvii, 47—washing, apparatus, Andrejeff. xxx, 43; Vaughan. xviii, 205—rapid washing (syphon arrangement), Davenport. xxix, 40; (in a press), Puy. xxx, 41; (automatic), Hinsdale. xxx, 42; (funnel syphon), Sartorius. xxx, 41—(intermittent, with Mariotte's tube). xxix, 35—washed out of flasks (by inversion), Austen. xxvi, 51.
Prefatory notices. xviii, 16; xix, 22; xx, 21; xxi, 21; xxii, 21; xxiii, 20; xxiv, 19; xxv, 19; xxvi, 19; xxvii, 19; xxviii, 19; xxix, 21; xxx, 19.
Premna TAITENSIS, Fiji. xxx, 146.
Preparations, HOME MADE, Fredigke. xx, 200.
Preicott, A. B., glac. phosphor. ac. of commerce. xx, 259—sulphophenic acid. xix, 550—testing extract of malt. xxx, 637—opium assay. xxvi, 807—assay of tinct. opium. xxvi, 823—pharmaceutical education. xix, 425—free strychnia fr. brucia. xxvi, 806—thymol. xxx, 620.
 — discussions. xix, 96; xx, 60; xxx, 620, 637.
 — and **HUGO THUM**, separat. and estimat. of cinchona alkaloids. xxvi, 828.
Prescription, CLAMPS (numbered), Schelenz. xxvi, 87—**HINTS**, Blair. xxvi, 86—**LEGIBILITY**, dose, etc., Philadelphia College of Pharmacy. xxiii, 803; Richmond (Va.), pharm. assn. xxiii, 800—**NUMBERING**, Bowman. xxviii, 39—**OWNERSHIP** in Denver, Colorado. xxi, 142.
Preservative, Jannarch. xxviii, 90—**Sesemann**. xxviii, 91—**Wickersheim**; **Martenson**. xxviii, 91.
Presidents, SINCE ORGANIZATION. xviii, 6; xix, 7; xx, 7; xxi, 7; xxii, 7; xxiii, 7; xxiv, 7; xxv, 6; xxvi, 6; xxvii, 6; xxviii, 6; xxix, 8; xxx, 6.
 — *pro tem.* J. F. Moore. xix, 25.
Press. See **DRUG PRESS**.
Prices, see **RESPECTIVE ARTICLES** (under "drug market").
 — "**BOTTOM**," fallacy, Bedford. xxi, 423.
Primrose, EVENING-, = *Oenothera biennis*, Kansas. xxix, 448.
Primula VERIS, cont. arthanitin. xxviii, 163—flowers, loss in drying. xxi, 202.
Primulaceæ, California. xix, 304; Kansas. xxix, 449.
Princewood BARK = *Cordia gerascanthoides*; *Hamelia ventricosa*; and *Exostemma caribæum*. xxiv, 152.
Prinos VERTICILLATUS, analysis, Collier. xxix, 233—cont. no berberina, Lerch. xxi, 259.
Priority (in publishing papers), discussion. xxi, 82, 3.
Pritchardia FILAMENTOSA, California. xxvii, 138.
Prize essays, discussion. xxiv, 656—duties of committee defined. xxiv, 601; xxv, 509.
Prizes, fr. sinking fund, Ebert. xxi, 48—**Apotheker Verein**. xix, 318—**Flückiger** and **Ludwig**. xix, 318—**Goettingen**. xix, 317—**Hagen-Bucholtz Stiftung**. xix, 318—**Petroleum industr. Soc. Halle**. xix, 317—**Madrid**. xix, 317—**Munich**. xix, 319—**Soc. Advancement Industry, Prussia**. xix, 318.
Proceedings, COMPLIMENTARY (LIST OF SOCIETIES, etc.). xviii, 318; xix, 559; xx, 315; xxi, 662; xxii, 576; xxiii, 848; xxiv, 844; xxv, 583; xxvi, 924; xxvii, 833; xxviii, 586; xxix, 536; xxx, 675.
Proceedings to be sent to LIFE-MEMBERS only on their application (indefinitely postponed). xxvii, 801.
 — about **REDUCING** the **SIZE**, by cutting out all useless matter, etc. xxvi, 890.
 — **TYPE** changed. xxiv.
Procellaria GLACIALIS (a petrel), prop. of oil. xix, 153.
Procter, Jr., W., *Abies canadensis*. xviii, 134—cacao butter. xviii, 83—entertainment. xxi, 85—extr. jalap. xix, 116—fld. extr. senega. xix, 115—keeping herbs. xix, 122—inviting International Congress. xix, 72, 4—morphimetric process for the pharmacopœia. xviii, 129—ointment of cucumber. xxi, 601—orange colored glass as protect. to essential oils. xxi, 629—adult. of precipit. sulphur. xix, 61—portrait. xxii—earlier publicat. of replies to queries. xxi, 82—queries not being answered. xx, 54—furnishing report of exhibit to newspapers. xix, 126—seidlitz powder. xx, 89—substitution. xx, 84—suggestions to beginners in pharmacy. xxi, 523—suppositories. xviii, 83.
 — discussions: xviii, 46, 52, 53, 63, 64, 68, 75, 78, 82, 85, 96; xix, 33, 61, 65, 69, 72, 74, 76, 81, 87, 88, 89, 90, 93, 94, 97, 98, 107, 109, 110, 115, 116, 118, 122, 124, 126, 127; xx, 52, 53, 54, 55, 56, 61, 75, 76, 84, 88, 89, 90, 98, 99, 101, 102; xxi, 37, 38, 45, 56, 63, 66, 74, 76, 77, 82, 85, 88.
Progress of Pharmacy, xviii, 58; xx, 68; appointment of a permanent committee, Sander. xx, 39, 41—objection to dividing the work among three or more members. xx, 75—a journal of progress of phar., Sander. xx, 41—permanent reporter suggested, Wenzell. xix, 129—committee on permanent reporter. xx, 74—increase of salary, Squibb. xxi, 61, 73, 95; xxii, 550.
Propargyl alcohol, Henry. xxi, 337.
Propionyl-quinia, Hesse. xxix, 331.
Proprietary medicines, exhibition unsuited. xix, 388. See also **PATENT MEDICINES**.
Propyl compounds, see respective base.
Propylamin, see also **TRIMETHYLAMIN**.
 — commercial is chiefly trimethylamin, Schering. xxiii, 432, 3—valuable in rheumatism, and superior to digitalis on the heart, Namias. xxi, 384.
Propylene-glycol, directly fr. glycerin, Belchoubek. xxviii, 287.
Prosopis DULCIS, Texas, Mexico. xxiii, 649; xxiv, 776;—**P. JULIFLORA**, Arizona, Mexico. xxvii, 253, 4;—**P. TITICACO**, Arg. Republ. xxx, 138.
Prostanthera LASIANTHOS;—**P. ROTUNDIFOLIA**, Tasmania. xxi, 221.
Protagon (of Liebreich), comp., prop., Gamgee and Blankenhorn. xxviii, 364—existence doubted, Dekanow, Hoppe-Seiler, Thudichum. xxviii, 364.
Protamina (in salmon), Miescher. xxiii, 434.
Protein compounds, see also **ALBUMINOIDS**.
 — of the animal organism yield probably aspartic ac. xix, 236—quantitative separat. fr. other nitrogenous bodies, Stutzer. xxviii, 355—yield iodoform, Hager. xxx, 346.
Protinia ARBUTIFOLIA, Calif. xix, 301.
Protium, W. and A., India. xxiv, 195.
Protopine, history. xxi, 375—identical with macleyine, Eyckman. xxx, 233.
Protoplasm, fr. fructificat. of *Aethalium septicum*, comp., Rodewalde and Reinke. xxx, 144.
Protoquinamicina, Hesse. xxvi, 568.
Proustia PIMJBUS (?), Chili. xxiv, 766.
Prunin (eclectic) solubilities, Parker. xxx, 128.
Prunus ARMENIACA, Japan, descript., Holmes. xxviii, 179. See also **APRICOT**.
 — **BOKHARIENSIS**, India, descript., Dymock. xxvii, 239;—**P. MUME**, Japan. xxviii, 179;—**P. SPINOSA**, Persia. xxvii, 240; flowers cont. a ferment, Kosmann. xxv, 330;—**P. VIRGINIANA**, see **WILD CHERRY**.
Prussides, prep., Bong. xxvi, 370.
Pseudaconia, Wright and Luff. xxvi, 597; xxvii, 509.
Pseudaconitia, Flückiger. xix, 228; Groves. xxiii, 425; Wright and Luff. xxvi, 597, 8, 9; xxvii, 509; xxix, 342; xxx, 429.

- Pseudaconitia**, NITRATE, ought to be employed for aconitia fr. *Aconitum ferox*, Wright and Luff. xxvii, 510.
- Pseudo-CUNARIA** (of Lukowski) is a mixture, Bitteli. xxiv, 368.
- **-INDICAN**, fr. *Thevetia neriifolia*, Warden. xxx, 183.
- **-ISOPYRINE**, Harsten. xxi, 233, 382.
- **-JERVIN** (of Wright), Bullock. xxviii, 107.
- **-MASTICH**=exudation fr. *Atractylis gummifera*. Greece. xxiv, 141.
- **-MORPHIA**, history. xxi, 374.
- **-NARCISSINA**, Gerrard. xxvi, 191.
- **-PELLETIERINA**, Tanret. xxviii, 342.
- **-EINAMIKI**=leaves of *Anagyris foetida*, Greece. xxiv, 189.
- **-TOLUIDINA**, Rosenstiehl. xxiv, 368.
- Pshoa-gendha**=*Physalis somnifera*, India. xxvi, 160.
- Psidium POMIFERUM**, India, descript., Dymock. xxvi, 160.
- Psilotum TRIQUETUM**, cont. alumina, Church. xxiii, 126.
- Psoralea CASTOREA**, Arizona. xxvii, 245; — **P. CORYLIFOLIA**, India, descript., Dymock. xxv, 209; Loll Dey. xxx, 245; — **P. ESCULENTA**, Kansas. xxix, 447; — **P. GLANDULOSA**, Chili. xxiv, 765; — **P. MEFHITICA**, Arizona. xxvii, 245; — **P. PHYSODES**, California. xix, 300.
- Psychotria EMETICA**, constituents of root, Attfield. xviii, 280.
- Psyllium**, seed in constipation. Mussy. xxx, 161—prop. of purif. mucilage, Kirchner and Tollens. xxiv, 315.
- Ptelea TRIFOLIATA**, adult. of powder. xxx, 577—in Kansas. xxix, 450—Ohio. xxviii, 503.
- Pterocarpus DRACO**, Mexico. xxiv, 768; — **P. FLAVUS**, China. xxiv, 752; — **P. MARSUPIUM**, India. xxiv, 718; — **P. SANTALINUS**, see SAUNDERS, RED.
- Pterocaulon PYCNOSTACHYUM**, descript., Maisch. xxvi, 227.
- Pterospermum SUBERIFOLIUM**, India, Dymock. xxvi, 165.
- Ptomaines**, importance in forensic analysis, Husemann. xxix, 349—distinct. fr. plant-alkaloids by pot. ferricy., Brouardel and Boutigny. xxx, 440; (denied by Spica and Beckurts. xxx, 440, 1)—are amido-acids, Casali. xxx, 441—inferior animals, Schlagdenhauffen. xxx, 441—fr. cadavers, Selmi. xxvi, 521.
- See also SEPTICIN.
- Ptyalin**, incompatible with pepsin and acids, Scheffer. xxiv, 551—compound with starch, Wittich. xxiii, 468.
- **SACCHARATED**, prop., Brown. xxii, 289.
- Ptychotis AJOWAN**, India. xxiv, 721.
- Publication of PAPERS IN ADVANCE**, discussion. xxi, 82; xxii, 521; xxiii, 792—Hancock. xxii, 543.
- **RECEIVED**. xviii, 321; xix, 562; xx, 318; xxi, 665; xxii, 579; xxiii, 851; xxiv, 842; xxv, 581; xxvi, 922; xxvii, 831; xxviii, 585; xxix, 535; xxx, 674.
- Puccina** (of Wayne) is impure sanguinarina, Hopp. xxiii, 233.
- Pudma kasta**=a spec. of cherry, India, descript., Dymock. xxv, 207.
- Pu-hwang**=*Typha bungeana*, China. xxviii, 103.
- Pukatea**=*Atherosperma Nova-Zealandia*. xxiv, 737.
- Pulas FLOWERS**=*Butea frondosa*, India. xxiv, 718.
- Pulque**=Agave wine, account, Jackson. xxiii, 135.
- Pulsatilla**, its activity resides only in its volatile constituents, Buchheim. xxii, 127.
- Pulvis**. See POWDER.
- Pumelo**=*Citrus decumana*, China. xxiv, 743.
- Pumice stone**. in Lipari. xxx, 281.
- Pumpkin seed**, as active without as with the perisperm, Vigier. xxv, 200; perisperm most active, Heckel. xxiv, 183; xxv, 200—analysis, Kopylow. xxv, 199, 200—uses in Syria. xxi, 145—in electuary, Slop. xxx, 68—young plant cont. glutamic acid, Schulze and Barbieri. xxvi, 278.
- Punginaire**, var. of olive, Italy. xxi, 217.
- Punica GRANATUM**. See also POMEGRANATE BARK—in Japan. xxviii, 176—in Malta. xxvi, 167.
- Pupalia GENICULATA**, China. xxiv, 757.
- Pupli**=*Ventilago madraspatana*, India. xxiv, 716.
- Purga de gentio**=*Anda Brasiliensis*. xxvii, 267.
- Purpurin**, synthesis fr. alizarin, Lalandes. xxiii, 456—coloring power, Küpfer. xxiv, 383.
- Purple**, LONDON, comp. and value as insecticide, Collier. xxix, 274.
- **TOKIO**, fr. *Lithospermum erythrorhizon*. xxvii, 164.
- Purpurogallin**, Struve. xxii, 261.
- Purslane**=*Portulaca oleracea*, Kansas. xxix, 449.
- Putchak**=*Aplotaxis costus*, India. xxvi, 161.
- Putchuk**=*Aplotaxis lappa*, India. xxi, 224; — **A. auriculata**, India. xxvi, 224.
- **GREEN**=*Aristolochia recurvilabra*, China. xxi, 209, 210.
- Putty**, FRENCH, Ruban. xxi, 197.
- Pwai nyet**=*Canarium strictum*, India. xxiv, 718.
- Pwan-hia**=*Pinellia tuberifera*, China. xxviii, 102.
- Py-choang** = yellow sulphide of arsenic, China. xxii, 32.
- Pycnanthemum LINIFOLIUM**, cont. probably caffeine-tannic ac., Mohr. xxiv, 512, 687—Kansas. xxix, 446.
- Pycnocoma MACROPHYLLA**, South Africa, xxvi, 306.
- Pynophorus NOCTILUCIS**, xxvii, 818, note.
- Pyralis FARINALIS** (meal moth) as destroyer of drugs, Saunders. xxi, 628.
- Pyrenelaion**=oil fr. olive kernels by bisulphide carbon, Greece. xxv, 140; xxvi, 208.
- Pyrethrum FLOWERS**. See also INSECT-POWDER—active principle, Rother; Seminoff; Textor; Bellesme. xxx, 192.
- **CARNEUM**, act. principle, Bellesme. xxv, 157—value as insecticide, Saunders. xxvii, 177.
- **CINERARIÆFOLIUM**, constituents, dal Sie. xxviii, 147—value as insecticide, Kalbrunner. xxiii, 167; Saunders. xxvii, 177.
- **CORYMBOSUM**; — **P. INODORUM**; very slow insecticide, Kalbrunner. xxiii, 167.
- **PARTHENIUM**, Chili. xxiv, 765—very slow insecticide, Kalbrunner. xxiii, 167.
- **ROSEUM**, cultivation, Markoe. xix, 116—in Germany. xxiii, 166—herb worthless as insecticide, Kalbrunner. xxiii, 167—flowers, value as insecticide, Saunders. xxvii, 177.
- Pyrites**, gold extracted by bromine, Wagner. xxiv, 218—estimat. of sulphur, Boeckmann. xxx, 265—statistics, France. xxiv, 212.
- Pyro-copal**, Schwartz. xxvii, 208.
- Pyro-gallol**, act. of chlorine, Stenhouse and Groves. xxiv, 341.
- Pyrola CHLORANTHA**; — **P. ELLIPTICA**; — **P. ROTUNDIFOLIA**, var. **ASARIFOLIA**, constituents, Smith. xxx, 188.
- Pyroleum OXYCEDRI** (juniper tar). xxvi, 325.
- Pyrolusite**, California. xxvii, 593.
- Pyrophosphates** converted into phosphates, Prinvault. xxi, 282.
- Pyro-schwell-copal**, Schwarz. xxvii, 208.
- Pyro-soluble-copal**, Schwarz. xxvii, 208.
- Pyrota MYLABRINA**, from Kansas to Mexico. xxiv, 509.
- Pyroxylin**. See GUN COTTON.

Q.

- "Q" section, Markoe. xxx, 663.
- Quanhscilote** = fruit of *Parmentiera edulis*. Mexico. xxvii, 157.
- Quantlatlatzin**, Mexico. xxiv, 771.
- Quaque** = *Sporobolus cryptandrus*, Utah. xxvii, 137.
- Quasima** = curare plant, Brazil. xxvi, 215.
- Quassia**, detect. in beer, Hoffstadt. xxii, 227; Dragendorff, xxx, 339; Wittstein, xxiii, 341.
- Quassiin**, prep., prop., Goldschmiedt and Weidel. xxvi, 617.
- Quebec**, pharmacy law. xxiii, 543, 6.
- Quebrachamine**, Hesse. xxx, 184, 5.
- Quebrachicatechin**, Arata. xxx, 398.
- Quebrachine**, Hesse. xxix, 346; xxx, 184, 5.
- Quebracho** = *Aspidosperma quebracho*, account, Penzoldt. xxviii, 137—drug market. xxviii, 374; xxix, 374; xxx, 474—identical with China alba Payta, Wulfsberg. xxix, 345—pharmaceut. preparat., Burgos. xxviii, 139—sources, Hierony-

Quebracho. (Continued.)

- mus. xxviii, 138—test for adult., Fraude. xxix, 154—therapeut. value, Penzoldt. xxviii, 138.
- FRUIT, Arg. Republ. xxiv, 763.
- BLANCO = *Aspidosperma quebracho*. xxviii, 138—analysis, Hesse. xxx, 184.
- COLORADO = *Loxopterygium Lorenzii*. xxviii, 138—analysis, Hesse. xxx, 184—microscop. examin. of wood, origin of gum, Vogl. xxix, 231—Arg. Republ. xxvii, 283.
- FALSE, descript., Biel. xxviii, 139.
- FLOJO = *Iodina rhombifolia*. xxviii, 138.
- Quebrachol, Hesse. xxx, 184.
- Queensland, drugs, Centennial exhibit. xxiv, 740.
- Quelenquelen = *Polygala quidividis*, Chili. xxiv, 766.
- Quebratschia LORENZII, Brazil. xxviii, 138.
- Quercetin, in catechu, Læwe. xxii, 276—comp., Liebermann and Hamburger. xxviii, 344.
- Quercite and oxalic ac. yield formic ac., Lorin. xxii, 250.
- Quercitrin, is not a glucoside; correct formula, Læwe. xxiv, 370—comp., Liebermann and Hamburger. xxviii, 344—fr. Sicilian and Tyrolese sumach, Læwe. xxii, 276.
- Quercitron bark. xxvi, 647.
- Quercus ÆGILOPS, Greece, account, Landerer. xxvi, 312.
- AGRIFOLIA, California. xix, 306; xxvii, 275, 602;—Q. ALBA;—Q. AQUATICA, Kansas. xxix, 444;—Q. CHRYSOLEPIS, California. xix, 306; xxvii, 276;—Q. COCCINEA, Kansas. xxix, 444;—Q. DENSIFLORA, California. xxvi, 698; xxvii, 602;—Q. EMORYI, Arizona. xxvii, 275;—Q. FALCATA, Kansas. xxix, 444;—Q. HEMISP., California. xxvii, 602;—Q. LOBATA, California. xix, 306; xxvii, 602;—Q. MACROCARPA;—Q. NIGRA, Kansas. xxix, 444;—Q. OCCIDENTALIS, California. xxvii, 276;—Q. PALUSTRIS, Kansas. xxix, 444.
- PEDUNCULATA, cont. a ferment in young leaves and buds, Kosmann. xxv, 30, 330.
- PRINOS;—Q. RUBRA, Kansas. xxix, 444;—Q. SONOMENSIS, Calif. xix, 306; xxvii, 276;—Q. SUBER, California. xxvii, 276. See also CORK;—Q. TINCTORIA, Kansas. xxix, 444;—Q. UNDULATA var. PUNGENS, Calif. xxvii, 276.
- Queries, submitted to INTERNATIONAL PHARM. CONGRESS. xxii, 472.
- not otherwise disposed of, declared dropped and referred to general acceptance. xx, 103; xxii, 552—about so few replies. xviii, 67; xx, 54.
- LISTS: xviii, 8, 58; xix, 11, 54; xx, 11, 105; xxi, 12, 103; xxii, 11, 568; xxiii, 11, 825; xxiv, 11, 693; xxv, 11, 573; xxvi, 13, 918; xxvii, 13, 807; xxviii, 13, 575; xxix, 15, 525; xxx, 13, 666.
- Queries: ABIES CANADENSIS, reply W. Procter, Jr. xviii, 134.
- ACID BENZOIC, BORACIC, SALICYLIC, comparative value, accept. S. P. Sharples. xxiv, 11, 693; continued. xxv, 13; xxvi, 15.
- ACID CARBOL, comparat. value as disinfect. and antiseptic, accepted, E. C. Jones. xviii, 11; continued. xix, 16; dropped. xx, 105.
- ACID CARBOL. and AC. NITRIC, dangerous mixture, accept. C. G. Wheeler. xxii, 14, 571; reply. xxiii, 700.
- ACID HYDROCYANIC of commerce, if up to standard, accept. F. S. Jones. xx, 14, 108.
- ACID LACTIC, manuf. in U. S., accept. S. P. Sharples. xxiv, 12, 694—accept. P. J. Schumann. xxvi, 13, 918; continued. xxvii, 15, 809.
- ACIDS, MINERAL, about decreasing sp. gr., accept. P. W. Bedford. xxii, 12, 569; reply. xxiii, 661—examinat. of strength and purity, accept. P. W. Bedford. xx, 14, 109; continued. xxi, 16; reply. xxii, 429.
- ACID OLEIC, preparation, referred to Ch. Rice. xxi, 13; 104; reply. xxii, 460—and OLEATES, accept. W. S. Thompson. xxiv, 12, 694; reply. xxv, 415.
- ACID PHOSPHOR. DILUT., cause of precipit., accept. L. Dohme. xxi, 13, 105; reply. xxii, 431;—contamin. with pyroph. ac. prevented, accept. L. Dohme. xxii, 14, 571; reply. xxiii, 662.

- Queries: ACID PHOSPHOR. GLAC., accept., Prescott. xix, 13; reply. xx, 259.
- ACID SALICYLIC, act. of salts, accept., D. Hays. xxiv, 13, 695; reply. xxv, 465; acid salicylic, accept., R. V. Mattison. xxiii, 11, 825; continued. xxiv, 15; reply. xxv, 461.
- ACID SULPHUR. AROMAT., accept. Th. Doliber. xviii, 10; reply. xix, 444—accept. A. L. Snyder. xxvii, 13, 807; continued. xxviii, 15.
- ACID TARTARIC, purity of commercial, accept. H. J. Rose. xx, 14, 109; reply. xxi, 651—accept. J. Williams. xxiii, 13, 827; reply. xxiv, 542.
- ACONITIA and its source, general acceptance. xx, 14, 109.
- ACONITE ROOT, best process of assay, accept. L. M. Royce. xix, 11, 54; dropped. xx, 60.
- ALCOHOL, purity of commercial, accept. N. Peirpoint. xviii, 11; continued. xix, 16; dropped. xx, 105.
- ALKALOIDS similar to or identical with ATROPIA, accept. H. D. Garrison. xxiv, 14, 696; continued. xxv, 15.
- ALOIN, if effic. substit. for aloes, accept. A. P. Brown. xxiv, 15, 697; reply. xxv, 401—reliable process. accept. A. B. Prescott. xix, 11, 54; reply. xx, 60.
- ALUM, BURNT, of commerce, its source, accept. Th. Starr. xx, 14, 108; continued. xxi, 16; dropped. xxii, 552.
- APOCYNUM CANNABINUM and AP. ANDROSEMIFOLIUM, microscop. examin., accept. E. B. Stuart. xxviii, 13, 575; reply. xxix, 468.
- APOMORPHIA, cheaper process, referred to Chs. Rice. xxii, 13, 570; continued. xxiii, 15; dropped. xxiv, 674.
- APPRENTICESHIP and PRELIMINARY EDUCATION, accept. S. M. Colcord. xviii, 9; reply. xix, 418—accept. E. Parrish. xix, 15, 59; reply. xx, 173.
- ARGOL fr. CALIFORNIA, referred to J. G. Steele. xix, 11, 55; continued. xx, 15.
- ARNICA, best menstruum, accept. M. L. M. Peixotto. xxiv, 12, 694; dropped. xxv, 562.
- AROMATIC DRUGS, permanent concentr. prep., accept. G. F. H. Markoe. xxi, 15, 107; continued. xxii, 16; xxiv, 16.
- ARTANTHE ELONGATA, referred to J. M. Maisch. xxii, 13, 570; reply. xxiii, 645.
- ASPIDIUM MARGINALE, accept. G. W. Kennedy. xxvii, 14, 808; reply. xxviii, 464.
- BALS. TOLU EMULSION, accept. P. W. Bedford. xx, 11, 106; reply. xxi, 76.
- BELLADONNA LEAVES, commercial, accept. B. F. McIntyre. xxx, 14, 667.
- BENZIN, value for extract. OLEORESINOUS DRUGS, accept. Remington. xx, 12, 106; reply. xxi, 592; continued. xxi, 15; reply. xxii, 536.
- BENZOIN and relat. proport. of benzoic and cinnamic ac., accept. W. H. Brill. xxi, 14, 105; dropped. xxii, 552.
- BERBERINA, solubility in water, accept. O. Eberbach. xxx, 14, 668—accept. T. L. A. Greve. xxvii, 14, 808; continued. xxviii, 15; accept. xxix, 16, 526.
- BERBERINA and SALTS fr. hydrastis, accept. J. U. Lloyd. xxv, 13, 576; reply. xxvi, 800.
- BERBERIS AQUIFOLIA, if cont. berberina, accept. Fr. B. Power. xxviii, 13, 575; continued. xxix, 16, 526; xxx, 14, 668.
- BERBERINA, examin. of MOTHER LIQUORS, accept. E. Scheffer. xxviii, 13, 575.
- BISMUTH PREPARATIONS, commercial, purity, accept. P. W. Bedford. xxviii, 14, 576; continued. xxix, 16, 526; reply. xxx, 563—accept. J. H. Feenster. xxi, 12, 104; dropped. xxii, 552—accept. Ad. Tscheppe. xxv, 12, 575.
- BISMUTH and AMMON. CITRATE, a more stable substit., accept. G. F. H. Markoe. xviii, 8; continued. xix, 15; dropped. xx, 105.
- BISMUTH SUBNITR. and SUBCARB., commercial, accept. Th. F. Main. xx, 14, 108; continued. xxi, 16; dropped. xxii, 552.
- BLUR PILLS, proport. of mercury, accept. Ch. H. Bassett. xviii, 8; continued. xix, 15; dropped. xx, 104.
- BLUE MASS, POWD., accept. P. W. Bedford. xxv, 12—accept. J. F. Hancock. xxi, 12, 104;

Queries :

- reply. xxii, 374—accept. J. F. Hancock. xxii, 14, 571—accept. G. F. H. Markoe. xix, 13, 57; dropped. xx, 104.
- BROMIDES of ORGANIC and INORGANIC BASES, accept. Chs. Bullock. xxi, 13, 104; continued. xxii, 15; reply. xxiii, 703.
- BROMINE, statistics, accept. S. S. Garrigues. xx, 12, 106; reply. xxi, 650—accept. W. J. W. Gordon. xxx, 15, 669—accept. H. S. Wellcome. xxiii, 13, 827; continued. xxiv, 16; reply. xxv, 448.
- BROMO-CHLORALUM, referred to S. S. Garrigues. xxi, 12, 104; dropped. xxii, 552.
- BRUCIA, if POISONOUS, referred to R. Bartholow. xxx, 14, 668.
- BRUCIA, if it cont. STRYCHNIA, accept. S. A. D. Sheppard. xxx, 15, 668.
- BUCHU, which is the best, accept. P. W. Bedford. xxx, 14, 668.
- BURGUNDY PITCH, commercial, accept. J. Guerdan. xix, 12, 56; dropped. xx, 104.
- BUTTER CACAO, adult. and test of purity, referred to H. W. Lincoln. xix, 13, 56; reply. xx, 96—accept. G. Ramsperger. xxii, 12, 569; continued. xxiii, 15; reply. xxiv, 527.
- CACHETS DE PAIN, accept. G. A. Zwick. xxiii, 14, 829; reply. xxiv, 462.
- CAFFEIN, CITRATE, if only a mixture, accept. C. G. Wheeler. xxx, 13, 667.
- CALABAR BEANS and preparations, accept. G. W. Kennedy. xxi, 14, 106; continued. xxii, 15; reply. xxiii, 602.
- CAMPHOR, POWD., referred to J. C. Lowd. xviii, 8; reply. xix, 79, 441.
- CANNABIS AMERICANA, accept. H. P. Tarrant. xxvi, 13, 918.
- CANTHARIDAL COLLODION, accept. J. Roberts. xxiv, 12, 694; reply. xxv, 417.
- CANTHARIDATE OF POTASSIUM, accept. Ch. J. Kadish. xix, 11, 54; dropped. xx, 103.
- CANTHARIDES, CHINESE, accept. J. M. Maisch. xix, 15, 59; reply. xx, 246.
- CANTHARIDES, best assay, accept. J. M. Maisch. xx, 15, 109; reply. xxi, 647.
- CANTHARIDIN, accept. A. E. Ebert. xviii, 10; dropped. xix, 112.
- CANTHARIDES, best MENSTRUUM, accept. G. W. Sloan. xxix, 15, 525.
- CARDAMOMS, accept. J. N. Potts. xx, 13, 108.
- CATALPA CORDIFOLIA, general acceptance. xx, 12, 107.
- CERATE RESIN COMPD., accept. S. A. D. Sheppard. xxv, 12, 574; reply. xxvi, 768.
- CHEMICAL PREPARATIONS, HOME MANUFACTURE, referred to A. H. Jones. xxii, 11, 568—accept. A. W. Miller. xxiii, 14, 828; reply. xxiv, 533.
- CHICORY as an adult. of taraxacum, accept. L. M. Royce. xx, 12, 107; continued. xxi, 16; reply. xxii, 551.
- CHLORAL HYDRATE, as antiseptic, accept. T. R. Baker. xxii, 12, 569; reply. xxiii, 710—cause of milky mixt. with water, accept. C. L. Diehl. xx, 13, 108; reply. xxi, 89—tests of purity, accept. Maisch. xx, 14, 109; reply. xxi, 657—accept. J. Roberts. xxii, 14, 571; reply. xxiii, 707—liquid preparation, accept. G. F. H. Markoe. xviii, 8; reply. xix, 89—and CAMPHOR, accept. J. Roberts. xxiii, 12, 826; continued. xxiv, 16; reply. xxv, 457.
- CHLORODYNE, accept. J. F. Hancock. xxii, 13, 570; reply. xxiii, 610.
- CIMICIFUGA RACEMOSA, accept. Ch. J. Hood. xix, 12, 56; dropped. xx, 104—cause of ammoniacal odor, accept. E. S. Wayne. xxvii, 13, 807.
- CIMICIFUGIN, accept. J. U. Lloyd. xxviii, 13, 575.
- CINCHONA, COMMERCIAL, accept. P. W. Bedford. xxiii, 13, 828; dropped. xxiv, 674—accept. L. M. Royce. xxiv, 14, 696—accept. H. B. Parsons. xxx, 14, 667.
- CINCHONA, CRUDE ALKALOIDS, accept. R. Rickey. xxi, 15, 106; continued. xxii, 15; reply. xxiii, 644.
- CINCHONA ALKALOIDS, distinct. characters, ac-

Queries :

- cept. S. P. Sharples. xxiv, 14, 696; continued. xxv, 15.
- CINCHONIDIA SULPHATE, if it cont. sulph. magnesium, accept. G. W. Kennedy. xxx, 13, 667.
- CINCHOQUININE, referred to A. E. Ebert. xxi, 12, 104; reply. xxii, 448.
- CLEANLINESS AS A PHARM. VIRTUE, accept. J. M. AYERS. xx, 13, 108; continued. xxi, 16; reply. xxii, 348.
- COCA and preparations, accept. G. W. Kennedy. xxv, 11, 573; reply. xxvi, 764.
- COLCHICIA, accept. O. Eberbach. xx, 12, 106; continued. xxi, 15; reply. xxii, 453.
- COLCHICUM, removal of fixed oil, accept. E. L. Bœrner. xxv, 12, 575; reply. xxvi, 760.
- COLOGNE for SICK ROOM, accept. G. Leis. xxiii, 14, 828; reply. xxiv, 493.
- COLOGNE-WATER, accept. Ch. M. Miller. xxvii, 14, 808.
- COLORS for CONFECTIONERS, referred to S. P. Sharples. xxv, 12, 574; reply. xxvi, 796.
- COLOMBO, proper menstruum, accept. Ch. L. Eberle. xx, 13, 108; reply. xxi, 594.
- CONFECT. SENNA, accept. A. W. Miller. xxiv, 11, 693; reply. xxv, 398.
- COPAIBA, test for purity, accept. E. S. Kelley. xix, 13, 56; dropped. xx, 104.
- COSMOLINE, accept. Lemberger. xxi, 14, 105; reply. xxii, 384.
- COTTON-ROOT BARK, accept. J. U. Lloyd. xxiii, 12, 826; reply. xxiv, 518.
- CREAM OF TARTAR, infl. of manure to grape, general acceptance. xx, 11, 106.
- CREASOTE, commercial, accept. P. W. Bedford. xxix, 15, 525; reply. xxx, 573—accept. E. Sander. xix, 13, 57; reply. xx, 244.
- CROTON CHLORAL HYDRATE, referred to W. H. Egle. xxii, 13, 570.
- DAMIANA, accept. H. J. Menninger. xxv, 11, 574; reply. xxvi, 881—accept. H. S. Wellcome. xxiii, 14, 828.
- DEXTROQUININE, accept. C. G. Wheeler. xxvii, 13, 808.
- DISPENSING COUNTER, accept. J. F. Hancock. xix, 12, 56; reply. xx, 192—accept. J. F. Hancock. xxii, 14, 571; continued. xxiii, 15; reply. xxiv, 456.
- DRUGGISTS, U. S., statistics, accept. B. F. Stacey. xxi, 14, 106; reply. xxii, 516.
- DRUG MILLS, referred to A. Blair. xxii, 11, 568; reply. xxiii, 575—accept. Th. J. Covell. xix, 12, 55; reply. xx, 108.
- ELIXIRS, accept. O. Eberbach. xix, 13, 57; reply. xx, 264.
- EMULSIONS, OILY, accept. C. M. Helman. xxi, 13, 104; dropped. xxii, 552—accept. E. Gregory. xxiii, 14, 828; reply. xxiv, 485.
- EMULSION MORTAR, accept. E. Gregory. xxiii, 13, 827; continued. xxiv, 16; reply. xxv, 412.
- EPILOBIUM ANGUSTIFOLIUM, C. J. Biddle. xxiii, 13, 827; continued. xxiv, 16; reply. xxv, 434.
- ERGOT, BENZIN for removing oil, accept. P. W. Bedford. xxv, 11, 574—accept. Th. T. Goodale. xxviii, 14, 576.
- ERGOT, cause and prevention of DETERIORATION, accept. J. L. Lemberger. xxii, 13, 570.
- ERGOT, AMERICAN and EUROPEAN, accept. G. Zellhöfer. xxv, 11, 574.
- ERGOT, THERAPEUT. VALUE, accept. N. J. Kuhn. xxvi, 13, 918.
- ERGOT fr. GRASSES compared to ergot of rye, accept. J. A. Miller. xxi, 14, 105; dropped. xxii, 552.
- ERGOTIN, Bonjean's, accept. G. Zellhöfer. xxiv, 13, 696; reply. xxv, 404.
- ERIGERON CANADENSIS, act. after removal of oil, accept. F. Marion Murray. xxvi, 13, 918.
- ERIODICTYON CALIFORNICUM, accept. G. F. H. Markoe. xxiv, 15, 697—accept. Ch. Mohr. xxvi, 13, 918; reply. xxvii, 736.
- ETHER, commercial, accept. P. W. Bedford. xxii, 11, 568; reply. xxiii, 722.
- EUPATORIUM PERFOLIATUM, accept. J. M. Hirsh. xviii, 11; continued. xix, 16; dropped. xx, 105—accept. A. Boyd. xxi, 14, 106; continued. xxii, 15.

Queries: EXTRACTS, SOLID, if glycerin beneficial, accept. W. J. M. Gordon. xix, 14, 57; continued. xx, 15—accept. O. Oldberg. xxi, 14, 105; continued. xxii, 15.
EXTRACTS, POWDERED, accept. C. T. George. xxvi, 14, 919—accept. C. S. Hallberg. xxvii, 14, 808; continued. xxviii, 15; reply. xxix, 424.
EXTRACTS, NARCOTIC, English, accept. P. W. Bedford. xlii, 12, 569—in **POWDER**, accept. F. V. Heydenreich. xix, 14, 57; dropped. xx, 104.
EXTRACT ALOES, cold or boiling water. G. W. Kennedy. xxiv, 12, 695; reply. xxv, 402.
EXTRACT. COLCHIC. ACET., accept. J. Grahame. xxiv, 12, 694; continued. xxv, 14; xxvi, 15—continued to E. C. Jones. xviii, 11, 79; dropped. xix, 112.
EXTRACT. COLOCYNTH. COMP., G. F. H. Markoe, dropped. xviii, 66.
EXTRACT MALT, accept. E. H. Sargent. xix, 14, 58; dropped. xx, 104.
EXTRACT MEAT, accept. A. E. Ebert. xviii, 8; reply. xix, 79, 512.
EXTRACT. QUASSIA, aqueous and alcoholic, accept. J. S. Whall. xxi, 13, 104; reply. xxii, 379.
FANCY ARTICLES compatible with legitimate pharmacy, accept. S. Campbell. xviii, 9; continued. xix, 16; dropped. xx, 105.
FILIX MAS, American compared to European, general acceptance. xx, 12, 106.
FILTERING PAPERS, reply by J. M. Hirsh. xviii, 143—referred to J. S. Talbot. xxii, 11, 568; continued. xxiii, 15; xxiv, 15; xxv, 15.
FLUID EXTRACTS, accept. Ch. L. Mitchell. xxiv, 12, 694; continued. xxv, 14—accept. Ch. Rice. xxiii, 11, 826; dropped. xxiv, 673.
FLUID EXTRACTS, ALCOHOLIC STRENGTH, accept. Adam Conrath. xxix, 16, 527; reply. xxx, 545.
FLUID EXTRACTS, if **GLYCERIN** necessary, accept. G. Buck. xix, 14, 58; continued. xx, 16—accept. W. J. M. Gordon. xviii, 11; reply. xix, 439—accept. J. U. Lloyd. xxiv, 14, 696; reply. xxv, 408—accept. J. F. Moore. xxii, 12, 569.
FLUID EXTR. FOR DECOCTIONS and INFUSIONS, accept. J. H. Hancock. xxiii, 11, 826; continued. xxiv, 15; xxv, 15—accept. W. Saunders. xxvi, 14, 919; reply. xxvii, 710.
FLUID EXTR. CINCHONA, alkaloidal strength, accept. H. B. Parsons. xxx, 13, 667.
FLUID EXTR. ERGOT, deterioration by age, general acceptance. xxx, 14, 668.
FLUID EXTR. GLYCYRRHIZA, U. S. Ph. and **ALKALOIDS**, accept. W. McIntyre. xxiii, 11, 826; continued. xxiv, 15. See also **LICORICE**.
FLUID EXTR. GLYCYRRHIZA, MENSTRUUM, accept. J. P. Remington. xxv, 12, 575; reply. xxvi, 756.
FLUID EXTR. IPECAC, accept. J. F. Moore. xxiv, 11, 693; continued. xxv, 13.
FLUID EXTR. LACTUCARIUM, accept. J. L. Lemberger. xxiv, 13, 696; reply. xxv, 576.
FLUID EXTR. SASSAPARILLA, accept. J. F. Judge. xix, 14, 58; continued. xx, 16; reply. xx, 87; xxi, 596. See also **SASSAPARILLA**.
FLUID EXTR. TARAXACUM, accept. H. A. Vogelbach. xxiv, 13, 695; continued. xxv, 14—accept. A. G. Vogeler. xxviii, 14, 576.
FLUID EXTR. WILD CHERRY, accept. J. T. Shinn and I. J. Grahame. xxv, 12, 575; reply. xxvi, 883—accept. E. S. Wayne. xxiv, 11, 693; continued. xxv, 14.
FLUID VOLUME of dissolved solids, accept. P. C. Candidus. xxvi, 14, 919; reply. xxvii, 709, 786—continued. xxvii, 15, 809; reply. xxviii, 420.
FRANKENIA GRANDIFOLIA, accept. J. G. Groff. xxviii, 14, 576.
FRAZERA WALTERI, accept. T. L. A. Greve. xx, 11, 106.
GALBANUM and adult., accept. A. E. Ebert. xxv, 13, 575.
GARLIC, accept. Wallace Procter. xx, 11, 106; continued. xxi, 15; reply. xxii, 529.
GELSEMINIC ACID and **GELSEMINIA**, accept. J. M. Hirsh. xviii, 11—referred to Wormley. xix, 16; dropped. xx, 105—general acceptance. xxi, 652.

Queries: GELSEMIUM SEMPERVIRENS, accept. W. H. Jones. xxiii, 13, 828; continued. xxiv, 16; xxv, **GLYCERIN, TEST OF PURITY**, accept. J. P. Remington. xxviii, 8; reply. xix, 539.
 16—accept. G. J. Luhn. xxvi, 13, 918; continued. xxvii, 15, 809; xxviii, 15.
GERMANIAN, if it cont. tannin, accept. E. L. Patch. xxviii, 14, 575; reply. xxix, 457.
GERMINATION OF SEEDS, accept. W. Saunders. xxviii, 14, 576; continued. xxix, 16, 526; reply. xxx, 565.
GILLENIA TRIFOLIATA, reply by A. E. Ebert. xviii, 67.
GLUCOSE for **CANE SUGAR** in pharm. prep., accept. Allaire. xxviii, 14, 575; reply. xxix, 405—accept. J. M. Hirsh. xix, 14, 58; continued. xx, 16; dropped. xx, 104—accept. E. H. Sargent. xxv, 13, 575; continued. xxvi, 15.
GLYCERIN, ESTIMATION, accept. B. F. Davenport. xxviii, 13, 575; reply. xxix, 524.
GLYCERIN, HYGROSCOPICITY, accept. G. W. Kennedy. xxv, 11, 574; continued. xxvi, 15; reply. xxvi, 881; xxvii, 724.
GLYCERIN, as substit. for **SUGAR** and **ALCOHOL**, accept. J. Harrop. xix, 14, 58; continued. xx, 16.
GLYCYRRHIZIN, reply by J. M. Hirsh. xviii, 133.
GRADUATES in PHARMACY, if better paid than non-graduates, accept. P. Balluff. xxi, 14, 106; reply. xxii, 353.
GRADUATED MEASURES, accept. W. H. Pile. xx, 13, 107; reply. xxi, 573.
GRADUATED MEASURES, ACCURACY, accept. S. P. Sharples. xxiii, 14, 828; reply. xxiv, 459—accept. W. P. Thompson. xxii, 13, 570.
GRANULAR EFFERVESCENT SALTS, continued to H. C. Archibald. xix, 16; dropped. xx, 105—accept. S. Campbell. xviii, 9—accept. R. V. Mattison. xxi, 15, 106; reply. xxii, 368—accept. J. Steer. xix, 12, 55; dropped. xx, 104.
GRINDELIA ROBUSTA, accept. Ch. L. Mitchell. xxiv, 14, 696; continued. xxv, 15.
GUAIAACUM, liquid preparation, accept. J. T. Shinn. reply. xviii, 78, 148.
GUARANA, accept. S. W. Cochrane. xxiv, 14, 696; continued. xxv, 15—accept. J. H. Feemster. xxviii, 14, 576; xxix, 17, 527; reply. xxx, 569—accept. J. H. Feemster. xxx, 16, 669—accept. G. W. Kennedy. xxiii, 12, 826; reply. xxiv, 491.
GUM RESINS, accept. J. McBride. xix, 11, 54; dropped. xx, 103.
HOME CULTIVATION of DRUGS, accept. H. S. Wellcome. xxv, 11, 574; continued. xxvi, 14—accept. B. O. Wilson. xxii, 12, 569; continued. xxiii, 15; dropped. xxiv, 674.
HOME MADE CHEM. and PHARM. PREPARATIONS, accept. Ch. F. Fredigke. xix, 12, 55; reply. xx, 200—accept. J. R. Mercein. xxiii, 12, 826; continued. xxiv, 15; xxv, 15; reply. xxvi, 789.
HONEY TRADE of U. S., reply by B. F. Stacey. xviii, 141.
HOPS, accept. P. W. Bedford. xxiii, 12, 826; dropped. xxiv, 673.
HYDRASTIS, accept., E. Bœrner. xxvi, 14, 918; continued. xxvii, 15—accept., Fr. B. Power. xxviii, 13, 575; continued. xxix, 16, 526; xxx, 15, 668.
HYPODERMIC SOLUTIONS preserved, accept. E. H. Squibb. xx, 14, 109; reply. xxi, 589.
HYPOPHOSPHITES of commerce, accept. W. C. Dunkee. xxviii, 15, 577.
INDIAN DRUGS, medicinal value, general acceptance. xviii, 10; reply by B. F. Stacey. xxi, 616.
INDIGENOUS DRUGS, source and supply, accept. C. B. Allaire. xxx, 16, 670—reply by C. L. Diehl. xviii, 137.
INSECT ENEMIES of drugs, W. Saunders. xx, 13, 108; reply. xxi, 624.
INSECT POWDER, mode of action, continued to S. S. Garrigues. xviii, 11, 65; reply. xix, 505.
IODINE and kelp supply, accept. P. W. Bedford. xxx, 15, 669.
IODIFORM, best process, accept. H. M. Wilder. xxii, 13, 570; reply. xxiii, 717.

Queries : IRON, DIALYZED, accept. A. Tscheppe. xxv, 11, 574; continued. xxvi, 16.
IRON, HYDRATED OXIDE, fr. conc. instead of fr. diluted solutions, accept. G. F. H. Markoe. xxvii, 15, 809; reply. xxviii, 459.
IRON by HYDROGEN, accept. J. L. A. Creuse, xxi, 14, 106; reply. xxii, 435—accept. Th. Doliber. xix, 13, 57; dropped. xx, 104—accept. J. F. Judge. xx, 12, 107.
IRON REDUCED WITHOUT HYDROGEN, accept. E. S. Wayne. xxix, 15, 525.
IRON and POTASSIUM TARTRATE, liquid preparation, accept. C. Hohly. xx, 12, 107; continued. xxi, 15, reply. xxii, 536.
IRON PYROPHOSPHATE, accept. Ch. Caspari, Jr. xxvii, 13, 807; reply. xxviii, 460—accept. G. F. H. Markoe. xxv, 11, 574; continued. xxvi, 14.
IRON and QUINIA CITRATE of commerce, accept. L. D. Drury. xxi, 15, 106; commerce. xxii, 16; reply. xxiii, 820, 1.
IRON, CARBONATE, of commerce, accept. P. W. Bedford. xviii, 9; reply. xix, 528.
IRON, TASTELESS, preparations, referred to G. F. H. Markoe. xxii, 12, 568.
ISINGLASS, AMERICAN, accept. G. M. Hambright. xix, 13, 56; dropped. xx, 104.
JABORANDI, menstruum, accept. G. W. Kennedy. xxviii, 14, 576; reply. xxix, 421.
LACTOPEPTIN, accept. E. Scheffer. xxiii, 14, 828; reply. xxiv, 546.
LACTUCARIUM, accept. J. L. Lemberger. xxiv, 14, 696; reply. xxvi, 762.
LEAVES of BIENNIAL PLANTS, proper time for collecting, accept. J. M. Maisch. xx, 12, 107; reply. xxi, 621.
LEMON, CULTIVATION abroad and at home, general acceptance. xx, 11, 106.
LEPTANDRIN, referred to H. G. Keasby. xxiii, 13, 827; continued. xxiv, 16; xxv, 16—accept. J. U. Lloyd. xxvi, 13, 918; continued. xxvii, 15, 809; reply. xxviii, 421.
LICORICE EXTRACT of commerce, accepted F. X. Crawley. xix, 12, 55; dropped. xx, 104.
LICORICE EXTRACT, AMERICAN, accept. A. W. Miller. xxi, 12, 103; reply. xxii, 394.
LICORICE EXTRACT, BEST PROCESS, accept. M. L. M. Peixotto. xxiv, 14, 636; dropped. xxv, 562.
LICORICE ROOT, menstruum, accept. F. F. Prentice. xxix, 16, 526; continued. xxx, 14, 668—accept. E. W. Shedd. xxviii, 13, 575. See also **FLUID EXTRACT GLYCYRRHIZA**.
LINIMENT. SAPONIS, accept. J. W. Ehrman. xix, 13, 57; continued. xx, 15.
LIQUOR FERRI CHLORIDI, accept. M. S. Bidwell. xxiii, 14, 828; reply. xxiv, 481.
LIQUOR MAGNESII CITRATIS, accept. G. F. H. Markoe. xviii, 10; reply. xix, 532—accept. E. H. Sargent. xviii, 11; reply. xix, 530.
LIRIODENDRIN (of Emmet), general acceptance. xx, 11, 106.
LITHARGE for plaster, accept. E. S. Wayne. xxiv, 12, 694; continued. xxv, 14.
LUPULIN, AROM. SPIR. AMMON. as a menstruum, accept. F. S. L. Coffin. xxvii, 14, 808; reply. xxviii, 438—accept. C. T. George. xxvi, 14, 919.
MAGNESIUM CARBONATE of commerce, accept. P. W. Bedford. xxi, 13, 105; reply. xxii, 567—accept. G. Leis. xxiv, 13, 695; reply. xxv, 451.
MANNITE, ARTIFICIAL, reply by J. M. Hirsh. xviii, 128.
MATICO, its source, referred to J. M. Maisch. xxii, 13, 570; reply. xxiii, 645.
MELTING POINT, best method to determine, general acceptance. xxx, 15, 668.
MERCURY, condit. in prep. with SUGAR OF MILK, accept. P. W. Bedford. xxv, 12, 574; continued. xxvi, 15.
MEZEZEON bark, accept. O. Eberbach. xxx, 14, 608.
MEZQUITE GUM, accept. A. W. Miller. xxii, 12, 569; reply. xxiii, 647.
MICROSCOPES for pharmacists, accept. G. F. H. Markoe. xxiv, 14, 696; reply. xxv, 565.
MORPHIA SULPHATE, solubility in water, accept. M. L. M. Peixotto. xxi, 12, 103; dropped.

Queries :

xxii, 552—accept. Ch. Rice. xxii, 13, 570; reply. xxiii, 821.
MORPHIOMETRIC PROCESS for U. S. Ph., reply by W. Procter, Jr. xviii, 129.
MUSK of commerce, general acceptance. xxix, 17, 527; xxx, 16, 669.
NARCOTIC HERBS of commerce, accept. C. S. Hallberg. xxix, 17, 527; xxx, 15, 669.
NATROUS ETHER, accept. N. G. Bartlett. xix, 12, 56; continued. xx, 15. See also **SPIR. AETH. NITR.**
NATGALLS, AMERICAN, referred to E. S. Wayne. xxi, 12, 104.
OILS, ESSENTIAL, of commerce, accept. W. H. Crawford. xxix, 15, 526; continued. xxx, 13, 667.
OILS, ESSENTIAL, TEST for PURITY, accept. W. S. Thompson. xviii, 8; continued. xix, 15; xx, 16.
OILS, ESSENTIAL, if ORANGE-COL. GLASS protects, accept. W. Procter, Jr. xx, 12, 107; continued. xxi, 16; reply. xxi, 629; dropped. xxii, 552.
OILS, NON-DRYING, kept in colored bottles, accept. Th. E. O. Marvin. xxiii, 12, 823; continued. xxiv, 16.
OILS, MIXED, act. of SUNLIGHT, accept. J. F. Moore. xx, 12, 107.
OIL CADE of commerce, general acceptance xxx, 16, 670.
OIL CASTOR, product. in U. S., referred to F. X. Crawley. xviii, 9; continued. xix, 16; dropped. xx, 105.
OIL CASTOR, alleged deficiency in strength, accept. E. A. Smith. xxii, 12, 570—accept. C. G. Wheeler. xxiii, 14; dropped. xxiv, 674.
OIL CEDAR, of commerce, accept. J. H. Stein. xxv, 13, 575; continued. xxvi, 14.
OIL COD-LIVER, AMERICAN, source, referred to S. M. Colcord. xix, 13, 57; continued. xx, 15.
OIL COD-LIVER, PHARMACEUT. PREP., acc. H. E. Griffith. xxviii, 14, 576; reply. xxix, 429—accept. Williams. xxiv, 13, 695; continued. xxv, 15.
OIL ERIGERON, accept. E. J. Weeks. xix, 12, 55; reply. xx, 242.
OIL MALE FERN, value of deposit, acc. Ch. F. Hartwig. xxix, 15, 526; continued. xxx, 15, 667.
OIL MUSTARD SEED, essential, artif and natural, general acceptance. xxx, 15, 669.
OIL PEPPERMINT, accept. J. C. Borchardt. xix, 12, 54; dropped. xx, 103.
OIL OLIVE, test for adulterations, accept. H. N. Rittenhouse. xviii, 9; reply. xix, 508.
OIL LEMON of commerce. xxx, 13, 667.
OIL THYME of commerce, accept. J. L. Lemberger. xxix, 15, 525; reply. xxx, 616.
OIL THYME, if formerly it cont. more **THYMOL** than now, accept. J. P. Remington. xxx, 16, 669.
OIL THYME, WHITE and RED, general acceptance. xxx, 16, 669.
OIL WINTERGREEN, if **OIL BIRCH** is sold instead, accept. G. W. Kennedy. xxx, 16, 669.
OIL WINTERGREEN. ARTIFICIAL fr. salicylic ac., general acceptance. xxx, 15, 669.
OINTMENTS, best SUBSTITUTE FOR LARD, accept. J. M. Good. xxvii, 14, 808; continued. xxviii, 15.
OINTMENTS, preserved by **BENZOIN** and **STORAX**, accept. J. J. Grahame. xxiv, 11, 693; continued. xxv, 14; reply. xxv, 549.
OINTMENT BOXES, general acceptance. xx, 12, 107.
OINTMENT, CITRINE, accept. A. G. Vogeler and C. S. Hallberg. xxix, 17, 527.
OINTMENT, CUCUMBER, accept. W. Procter, Jr. xx, 12, 107; reply. xxi, 601.
OINTMENT, MERCURIAL, of commerce, accept. G. W. Kennedy. xxix, 17, 527; reply. xxx, 551.
OINTMENT, PETROLEUM, melting point, accept. Ch. Rice. xxviii, 13, 575; reply. xxix, 430.
OLEATES, accept. W. S. Thompson. xxiv, 12, 694; reply. xxv, 415.
OPIMUM, DOMESTIC, production, P. W. Bedford, dropped. xviii, 67.

Queries: ORANGE PEEL, active constituents, accept. R. Stabler. xxi, 14, 105; reply. xxii, 391.
ORGANIC SOLUTIONS, results of DECOMP., accept. E. B. Stuart. xxviii, 13, 575.
PANCREATIN, accept. J. H. Hancock. xviii, 9; continued. xix, 15; xx, 16—accept. F. E. Heydenreich. xxi, 13, 105—accept. W. S. Thompson. xxii, 13, 570; continued. xxiii, 15; dropped. xxiv, 674.
PANCREATIN, if converted into PEPTONE by pepsin, E. Scheffer. xxii, 14, 571; reply. xxiii, 725.
PAPER PULP for filtering, accepted J. F. Judge. xx, 11, 106.
PARAFFIN and its pharm. uses, referred to B. F. Stacey. xxi, 12, 569; reply. xxiii, 629.
PARTS BY WEIGHT, accept. S. P. Sharples. xxiii, 14, 828; continued. xxiv, 15; reply. xxiv, 453; xxv, 519.
PEPSIN, accept. Th. Doliber. xix, 13, 57; dropped. xx, 104—continued to Mason McCollin. xviii, 11, 73; xix, 16; dropped. xx, 105.
PEPSIN, GLYCEROLE, accept. J. R. Mercein. xix, 14, 57; continued. xx, 15.
PEPSIN, best form for DISPENSING, general acceptance. xxx, 15, 668.
PEPTONIZED MEAT, accept. C. S. Hallberg. xxvii, 14, 808.
PERCOLATION, SUCCESSFUL, accept J. U. Lloyd. xxv, 13, 576; continued. xxvi, 14; reply. xxvii, 682.
PERCOLATION, if ALCOHOLIC MENSTR. increases in STRENGTH, accept. J. U. Lloyd. xxx, 16, 669.
PHOSPHORETTED RESIN, if a liquid prep. be possible, accept. G. W. Sloan. xxii, 11, 569; reply. xxiii, 616.
PHOSPHORUS, commercial, pres. of arsenic, accept. L. Dohme. xxiii, 13, 827; reply. xxiv, 541.
PHOSPHORUS, DISPENSING in liquid or pill form, accept. W. Neergaard. xx, 11, 106.
PHOSPHORUS, best process for PILLS, accept. Th. S. Wiegand. xix, 11, 54; dropped. xx, 103.
PHYSICIANS' PERCENTAGE, accept. H. W. C. Martin. xxix, 15, 525; continued. xxx, 14, 667.
PHYSICIAN and PHARMACIST, relation, accept. E. P. Nichols. xxi, 13, 104; continued. xxii, 15; reply. xxiii, 157.
PILLS, COMPRESSED, accept. J. H. Hancock. xxiii, 12, 826; continued. xxiv, 15.
PILL EXCIPIENTS, accept. F. Marion Murray. xxvi, 14, 919.
PILLS, SUGAR-COATED, if the coating cont. starch, chalk, terra alba, acc. P. W. Bedford. xxx, 13, 667.
PILLS (QUININE), SUGAR- and GELATIN-COATED, EXAMIN., accept. V. Coblentz. xxx, 13, 666.
PILLS, SUGAR-COATED, TRUE TO LABEL, accept. D. Hayes. xxii, 11, 568; continued. xxiii, 15; xxiv, 15; reply. xxv, 562—accept. J. R. Mercein. xix, 13, 56; continued. xx, 15.
PILLS, SUGAR-COATED, responsibility for INTRODUCTION, accept. J. F. Moore. xix, 15, 58; continued. xx, 16.
PILLS, to be introduced into U. S. PH., accept. R. V. Mattison. xxv, 12, 574; continued. xxvi, 15.
PILLS, COMPD. CATHARTIC, of commerce, accept. S. H. Stevens. xxx, 14, 667.
PILLS, IRON CARBONATE, accept. E. D. Chipman. xx, 12, 170; reply. xxi, 600.
PLASTER, FLEXIBLE GELATINE, accept. H. N. Rittenhouse. xx, 11, 105; reply. xxi, 604.
PLASTER, prevent BRITTLINESS, accept. H. W. C. Martin. xxix, 15, 525; continued. xxx, 14, 667.
PLASTER, THAPSIA, for extemp. use, accept. H. B. Tarrant. xxv, 12, 575; continued. xxvi, 15.
PODOPHYLLIN, accept. J. U. Lloyd. xxv, 13, 576; reply. xxvi, 767—accept. B. F. McIntyre. xxiv, 13, 695; continued. xxv, 14.
POISONS, PREVENT MISTAKES in dispensing, accept. W. C. Bakes. xviii, 10; reply. xix, 436—accept. Ch. L. Eberle. xx, 13, 108; reply. xxi, 575.
POKE ROOT, accept. Ch. F. Fredigke. xix, 11,

Queries:

54; continued. xx, 15; xxi, 16—accept. J. F. Hancock. xviii, 8; continued. xix, 15; dropped. xx, 105.
POTASSA of commerce, accept. A. G. Vogeler. xxix, 17, 527; continued. xxx, 16, 669.
POTASSIUM, IODIDE, accept. A. B. Prescott. xxx, 14, 667.
POTASSIUM SULPHATE, accept. P. W. Bedford. xxi, 12, 104; reply. xxii, 499.
POTATO FLY, accept. W. H. Egle. xxii, 13, 570.
POWDERED DRUGS, commercial, accept. Chs. B. Allaire. xxix, 16, 526; reply. xxx, 574.
PREPARATIONS, U. S. PH. and PH. BRIT., objections to having them agree, general acceptance. xxii, 13, 570.
PROPRIETARY REMEDIES, responsibility for introduction, accept. J. F. Moore. xix, 15, 58; continued. xx, 16.
PULVIS AROMATICUS, accept. J. L. Lemberger. xx, 14, 108; reply. xxi, 588.
PUMPKIN SEED, active principle, accept. Ch. L. Jefferson. xix, 11, 54; dropped. xx, 103.
QUINIA SALT for HYPODERMIC INJECTION, accept. A. P. Sharp. xx, 14, 109; xxi, 13, 104; reply. xxi, 96; xxii, 377.
QUINIA PILLS, see PILLS.
QUINIA SULPHATE, EUROPEAN and AMERICAN, general acceptance. xxix, 17, 527; xxx, 16, 669.
QUINIA TANNATE of commerce, accept. Ch. F. Hartwig. xxix, 15, 525; xxx, 13, 667.
RENNET and PEPsin, accept. Cl. Parrish. xviii, 8; reply. xix, 511.
RESINOIDS, accept. W. J. M. Gordon. xix, 13, 57; continued. xx, 15—accept. W. J. M. Gordon. xxiii, 13, 827; continued. xxiv, 16; xxv, 16.
RESPONSIBILITY of PHARMACISTS, accept. R. H. Cowdrey. xxx, 15, 668.
RHAMNUS PURSHIANA, accept. G. W. Kennedy. xxvii, 14, 808; reply. xxviii, 431—accept. N. Rosenwasser. xxviii, 14, 576; continued. xxix, 16, 526—accept. J. G. Steele. xxviii, 14, 576; continued. xxix, 16, 526.
RHAMNUS PURSHIANA and RH. FRANGULA, accept. E. S. Wayne. xxix, 17, 527; continued. xxx, 15, 669.
RHAMNUS PURSHIANA, RED PRINCIPLE, general acceptance. xxx, 14, 668.
RHUBARB, TEST of VALUE, accept. C. B. R. Hazeltine. xix, 11, 55; dropped. xx, 103.
RHUBARB, if WATER EXTR. all purgative principles, accept. Ch. A. Heinitsh. xxi, 14, 105; reply. xxii, 390.
RHUBARB, INSECTS attacking it, accept. W. Saunders. xxii, 14, 571; continued. xxiii, 15; reply. xxiii, 818.
ROBINIA PSEUDACACIA, general acceptance. xx, 13, 107.
SAFFRON, AFRICAN, accept. J. M. Maisch. xviii, 10; reply. xix, 506.
SALARIES OF PHARMACISTS, accept. H. N. Rittenhouse. xxi, 14, 106; reply. xxii, 355.
SALICIN, accept. F. Gregory. xxv, 13, 575; continued. xxvi, 16.
SANTONIN of commerce, accept. C. L. Diehl. xix, 14, 58; dropped. xx, 104—accept O. Eberbach. xxii, 14, 571; continued. xxiii, 15; reply. xxiv, 544—accept. Fr. Hoffmann. xxi, 15, 106; reply. xxii, 456.
SAPO VIRIDIS, accept. P. Fr. Lehlbach. xx, 11, 106; reply. xxi, 604.
SARSAPARILLA and HEAT, accept. J. F. Judge. xx, 13, 108; reply. xxi, 595. See also FLUID EXTRACT.
SCAMMONY RESIN, accept. G. F. H. Markoe. xxi, 13, 104; continued. xxii, 15; xxiii, 16; xxiv, 16; reply. xxiv, 691; xxv, 406.
SEIDLITZ POWDERS of commerce, accept. Ch. W. Grassley. xix, 13, 57; reply. xx, 273.
SENEGA, accept. J. Wells. xxiii, 11, 825; reply. xxiv, 516.
SENEGA, ALKALINE MENSTRUUM, accept. G. W. Kennedy. xxvi, 14, 918; reply. xxvii, 721—accept. H. N. Rittenhouse. xviii, 11; reply. xix, 453. See also SYRUP.

Queries : SENEGA, microscop. **STRUCTURE**, accept. E. B. Stuart. xxix, 16, 526; continued. xxx, 15, 669.

SENEGA, FALSE, origin, accept. J. M. Maisch. xxiv, 13, 695; reply. xxv, 525.

SENNA, conc. pulverulent prep., accept. Cl. Parrish. xix, 12, 55; dropped. xx, 103.

SHOP FURNITURE, accept. G. H. Schafer. xx, 13, 107; reply. xxi, 583.

SNEEZEWHEED, accept. J. M. Maisch. xix, 14, 58; continued. xx, 16, 88; dropped. xxi, 100.

SOAP, MEDICINAL, accept. A. N. Marion. xxi, 15, 106; continued. xxii, 15—accept. G. H. Schafer. xxvii, 14, 808.

SODA BICARBONATE, accept. Ch. H. Bassett. xix, 13, 57; dropped. xx, 104—accept. P. W. Bedford. xxii, 15, 571; reply. xxiii, 689.

SODIUM PHOSPHATE of commerce, accept. P. W. Bedford. xxviii, 15, 577; reply. xxix, 433.

SOLUTIONS OF CHEMICALS in ALCOHOL, accept. P. C. Candidus. xxviii, 15, 576; continued. xxix, 16, 526; reply. xxx, 564.

SOLUTIONS for the **PRESCRIPTION COUNTER**, accept. G. W. Sloan. xxviii, 13, 575; reply. xxix, 404.

SPICE BUSH (*Laurus benzoin*), accept. A. W. Miller. xxv, 12, 575; reply. xxvi, 772.

SPIGELIA, accept. R. H. Land. xxvi, 13, 918.

SPIR. AMMON. AROMATICUS, accept. W. McIntyre. xxii, 12; 569; reply. xxiii, 606.

SPIR. AETH. NITROSUS, accept. P. W. Bedford. xix, 15, 58; dropped. xx, 104—accept. P. W. Bedford. xxiii, 11, 825; continued. xxiv, 15—accept. J. L. A. Creuse. xxiv, 13, 695—accept. F. Mahla. xviii, 10. See also **NITROUS ETHER**.

SPIR. AETH. NITROSUS and **FLD. EXTR. UVA URSI**, accept. J. L. A. Creuse. xxiv, 14, 696; continued. xxv, 15.

SQUILL, itching principle, accept. E. D. Chipman. xxiii, 13, 827; reply. xxiv, 526.

STATHMETOMETRICAL METHOD in U. S. Ph., accept. W. W. Bartlett. xxx, 15, 668.

STORE-ROOM and **CELLAR**, accept. J. F. Hancock. xx, 13, 107; continued. xxi, 16; xxii, 16; xxiii, 16; xxiv, 16; xxv, 16; reply. xxvi, 703.

STYLOPHORUM DIPHYLLUM, accept. O. Eberbach. xxiv, 13, 695; continued. xxv, 15.

SUCCUS CONII and **HYOSCYAMI** Ph. Brit., accept. Ch. L. Eberle. xxiii, 13, 827; dropped. xxiv, 672.

SUGAR OF MILK in U. S., accept. J. L. Lemberger. xix, 11, 55; reply. xx, 245—accept. J. L. Lemberger. xxviii, 13, 575; reply. xxix, 436.

SUPPOSITORIES, reply by Ch. L. Eberle. xviii, 150—accept. R. B. Ferguson. xviii, 8; reply. xix, 480—accept. G. W. Kennedy. xxi, 13, 105; reply. xxii, 383.

SUPPOSITORY MOULD, accept. R. V. Mattison. xxii, 12, 569; reply. xxiii, 625.

SYRUP. FERRI IODIDI, accept. P. W. Bedford. xxiv, 13, 695; continued. xxv, 14; xxvi, 16—accept. W. H. Pile. xxiii, 12, 826; reply. xxiv, 492.

SYRUP. FERRI PYROPHOSPHATIS, accept. J. F. Judge. xxiv, 12, 694; continued. xxv, 14; reply. xxvi, 898.

SYRUPS, FRUIT, accept. A. G. Vogeler. xxvii, 14, 808; reply. xxviii, 434.

TANNIN, estimation, general acceptance. xxx, 16, 669.

TAPIOCA, accept. W. J. Jenks. xxv, 13, 576; continued. xxvi, 14.

TARAXACUM, accept. Mason McCollin. xxi, 14, 105; dropped. xxii, 552.

TARAXACUM, if substituted by **CHICORY**, accepted. L. M. Royce. xx, 12, 107; continued. xxi, 46; reply. xxii, 551.

TARTAR EMETIC, accept. J. P. Remington. xviii, 10; reply. xix, 529.

TEMPERATURE, to MAINTAIN in liquids, general acceptance. xxx, 15, 668.

THERAPEUTICS NECESSARY for the pharmacist, accept. B. T. Fairchild. xxiii, 11, 825; continued. xxiv, 15; reply. xxv, 396.

THYMOL. See **OIL THYME**.

TINCTURES, accept. J. Jesson. xxv, 12, 574; continued. xxvi, 15.

Queries : TINCTURES fr. FRESH or DRY plants, accept. J. U. Lloyd. xxiv, 13, 695; continued. xxv, 15; reply. xxvi, 755.

TINCTURE BOLETUS LARICIS, accept. C. W. Phillips. xxx, 14, 668.

TINCT. COLOMBO, accept. Ch. L. Eberle. xx, 13, 108; reply. xxi, 594.

TINCT. FERRI CHLORIDI, accept. F. M. Harper. xxvii, 13, 807; continued. xxviii, 15. See also **LIQUOR FERRI CHLORIDI**.

TINCT. GELSEMIUM and **NITRIC AC.**, referred to Ch. C. Fredigke. xxi, 13, 94, 105; dropped. xxii, 552.

TINCTURE OPIUM, ASSAY, referred to R. J. Brown. xxiii, 14, 828; dropped. xxiv, 674—accept. A. Pfeiffer. xxiv, 14, 696. See also **MORPHOMETRIC PROCESS**.

TINCT. OPIUM of commerce, accept. L. M. Royce. xviii, 9; reply. xix, 447.

TINCTURA OPII DEODORATA, accept. Ch. E. Dohme. xviii, 10; continued. xix, 16; xx, 16.

TINCT. SANGUINARIA, accept. L. Dohme. xviii, 9; continued. xix, 16; xx, 16.

UNOFFICIAL PREPARATIONS, accept. R. J. Brown. xix, 14, 58; reply. xx, 207.

VANILLA, menstruum, accept. E. P. Nichols. xix, 14, 58; continued. xx, 16, 87; reply. xxi, 597.

VASELINE, accept. W. H. Crawford. xxvii, 13, 807.

VERATRUM VIRIDE, analysis, accept. Ch. A. Robbins. xxiv, 11, 693; reply. xxv, 439.

VESICATING INSECTS, American, accept. W. Saunders. xxii, 14, 571; continued. xxiii, 15; reply. xxiii, 818; xxiv, 505.

VINEGAR BITTERS, accept. O. Eberbach. xxii, 14, 571; reply. xxiii, 732.

WAFERS, MEDICINAL, accept. G. A. Zwick. xxiii, 14, 828; reply. xxiv, 462.

WAX(O), active principle, accept. Ch. E. Dohme. xviii, 9; continued. xix, 15; xx, 16.

WATER, BITTER ALMOND and **CHERRY LAUREL**, accept. P. C. Candidus. xxix, 16, 527.

WATER, CINNAMON, accept. E. C. Jones. xxiii, 12, 827; reply. xxiv, 485—accept. W. P. Thompson. xxii, 12, 569.

WATERS, MEDICATED, INSOLUBLE SUBST. to replace magnesia, accept. R. H. Cowdrey. xxvii, 13, 807—accept. S. A. D. Sheppard. xviii, 10; reply. xix, 442.

WATERS, MEDICATED, DISTILLED and from OIL, accept. N. H. Jennings. xxi, 12, 104; continued. xxii, 15.

WATERS, MINERAL, ARTIFICIAL, referred to A. Th. Moith. xix, 11, 12, 54, 56; reply. xx, 61.

WATER, SNOW, becomes ropy except that collect. in April, accept. G. W. Sloan. xxx, 13, 666.

WAX, WHITE, TEST for PURITY, accept. P. W. Bedford. xxiv, 12, 694; reply. xxv, 444.

WAX, WHITE, VARIETIES, accept. P. W. Bedford. xxv, 13, 576.

WAX, WHITE, SOLVENTS, accept. P. W. Bedford. xxv, 13, 575; continued. xxvi, 15—accept. P. W. Bedford. xxvii, 14, 809.

WAX, JAPAN, in pharm. prep., accept. G. C. Close. xix, 15, 59; xx, 223.

WAX, YELLOW, test for purity, accept. J. W. Pratt. xxviii, 15, 576—accept. J. J. Thomsen. xviii, 8; continued. xix, 15; dropped. xx, 105.

WRIGHT, AVOIRDUPOIS or METRIC for U. S. Ph., E. L. Milhau, dropped. xviii, 66.

WHAT SHALL I READ and **WHERE BEGIN?** accept. W. Procter, Jr. xx, 13, 108; reply. xxi, 523.

WILD CHERRY, cause of variat. in color of infus., continued to J. L. Lemberger. xviii, 11, 66; reply. xix, 503.

WINES OF CALIFORNIA, accept. W. Searby. xviii, 9; dropped. xix, 95.

WINE OF TAR, accept. Chs. A. Heinitsch. xxiii, 14, 828; reply. xxiv, 490.

Quicksilver, see **MERCURY**.

Quilcha Malilla, Arg. Republ. xxiv, 763.

Quillaya, adult. of powd. xxx, 577.

Quillain=dry extract of quillaya, McDonnell. xxx, 81.

Quillo-quillo, Arg. Republ. xxiv, 762.

Quimpe, Arg. Republ. xxiv, 763, 4.

Quina, Arg. Republ. xxiv, 762.

— DA CAMPO=Remigia ferruginea. xxvii, 183.

— MARACAIBO fr. Cinchona tucujensis. xix, 280.

— QUASSIA=Picrasma Velosii, Brazil, xxiii, 221.

— DE SERRA=Remigia ferruginea. xxvii, 183.

Quince, see also CYDONIA VULGARIS.

— SEED, adult., Hohley. xxix, 200—prep. of pure mucilage, Kirchner and Tollens. xxiv, 315.

Quinchamalium, Chili. xxiv, 766.

Quinamicina, Hesse. xxvi, 568.

Quinamidina, Hesse. xxvi, 567.

Quinamina fr. Cinchona succirubra (Darjeeling), Vrij. xxiii, 416; xxvi, 585—prop., Hesse. xxi, 230, 380; xxiii, 403; xxvi, 567—comp., test, Oudemans, Jr., xxviii, 330.

— MURIATE;—Q. SULPHATE, Hesse. xxi, 380.

Quinetin, oxydat. prod. fr. quinia, Skraup. xxviii, 326.

Quinetum, impure alkaloids fr. Cinchona succirubra (about 70 p. c. sulph. quinia) Hager. xxviii, 326—Dutch Phar. Soc. xxx, 406—microsublimating point, Blyth. xxvii, 483—therapeut. value, Vinckhuysen. xxvi, 586.

— BORATE, Dutch Phar. Soc. xxx, 406.

— SOLUBLE=Q. borate. xxx, 406.

Quinia, of Reichardt, cont. no quinia, Hesse. xxiii, 399.

— PHILIPPINA=extr. mangostan. xxiv, 767.

Quinicia, Hesse. xxiv, 352; xxvi, 566—salts (8) Hesse. xxiv, 353.

Quinidia see also CONCHINIA.

— (of Hesse)=Kerner's "α" quinidia and Pasteur's cinchonidia. xxiii, 400—(of Kerner) is cinchonidia, Hesse. xxvi, 566—(of Van Leer) is Pasteur's cinchonidia. xxiii, 401—act. of sulphomolybd. ammon., Buckingham. xxi, 369; of sulph. ac., bichr. pot., chlorin. lime, Hamlin, Jr. xxix, 325—commercial not true to name (cinchonid. and quin.) Hesse. xxiii, 415—estimat., Thresh. xxviii, 320—microsubl. point, Blyth. xxvii, 483—microsulphocy. test, Godeffroy and Ledermann. xxvi, 571; Schrage. xxiii, 410; xxvii, 491, 2—prop. Hesse. xxvi, 565—separat. fr. commercial quinoïdin, Vrij. xxi, 379—solubil. in alcohol, Latean. xxix, 324; in chlorof., Hesse. xxiii, 406—thalleioquine test, Zeller. xxix, 328—salts, Dwars. xxvii, 496.

— "γ" (of Kerner) is crystallized quinia, Hesse. xxiii, 398.

— fr. CHONDODENDRON TOMENTOSUM (!) Barnsley. xxiii, 180.

— HYDRIODATE, Nietsch. xxix, 332.

— SULPHATE (of Delondre, Boudet, Bouchardat and others) is cinchonidia sulphate. xxvi, 583—commercial is often cinchonidia cont. quinia. xxiii, 406—fluid volume, Candidus. xxviii, 420—purified, Prescott and Thum. xxvi, 828—test for purity, Hesse. xxvii, 506; Vrij. xxvi, 582—solubilities, Hesse, Vrij and others. xxvi, 829—water of cryst., Vrij. xxvi, 582.

— SULPHATE and cinchonidia sulph., history and distinct., Bouchardat. xxvi, 583.

— and UREA COMPOUNDS. Drygin. xxvii, 505.

Quinine ACTION of ammoniacal salts under the microscope, Cazeneuve and Caillot. xxvi, 575; of ferric chloride, butter antimony, stannous chloride, Godeffroy. xxvi, 559; of light, Flückiger. xxvi, 576; of permanganate of potassium, Kerner. xviii, 261; of bichromate mixt., chlorin. lime, Hamlin, Jr. xxix, 325; of sulphomolybd. ammon., Buckingham. xxi, 369—of zinc chloride, Jorisson. xxix, 267—adult. see QUININE, SULPHATE—probable constitution, Wischnegradsky and Butlerow. xxviii, 327—electrolysis, Burgoin. xix, 223.

— ESTIMATION: bism., pot. iod., Thresh. xxviii, 320—iodosulphate chinoidia, Vrij. xxiv, 348; xxix, 328; xxx, 408, 9—repeated shaking with chlorof. unnecessary, Dwars. xxvii, 498—in presence of sugar, glyc., etc. (chlorof. better than ether) Palmer. xxv, 302, 3—in iron and quinia citrate, Stevenson. xxvii, 501—in tinct., 18

Quinine. (Continued.)

wine, etc. Personne. xxvii, 502; (ether-alkali) Blythe. xxx, 410—lime, chlorof., Carles. xix, 280—as herapathite, Christensen. xxx, 407; Vrij. xxx, 408—as phosphomolybdate, Lobb. xxvi, 573—pot.-mercuric iodide, Johnston and Lobb. xxvi, 573. See also CINCHONA, ASSAY—extracted by benzol, Boireaux and Léger. xxiii, 411—antifermentative, Bing. xxi, 377, 401—fraudulent, (peculiar behavior) Pratesi. xxvi, 580.

— hypodermic solut. xix, 229; Lent. xxix, 75; proposes a lactate, Sharp. xxii, 377; xxiii, 76—microsulphocy. test, Godeffroy and Ledermann. xxv, 570; Hesse. xxvii, 493; Schrage. xxiii, 409; xxvii, 489—detect. of MORPHIA (ferricy. pot., ferric chlor.), Hager. xxi, 499; (dilut. nitr. ac.), Hesse. xxiii, 398; (iodic ac., chlorof.), Jassoy. xxii, 264; (nitr. silver). xxiv, 347—oxidation products (permang. pot.; chromic ac.), Skraup. xxviii, 326—causes of high price, Howard. xxvi, 240—properties, Hesse. xxvi, 565—test for purity (iodine), Dwars. xxvii, 496; (Kerner and Hesse best), Wolff. xxx, 412—precipitate, soluble in ether; sod. sulph.; water, Lobb. xxvi, 573—alleged conversion in the human body into quinidia (by Guillochin), disproved by Personne. xxvii, 503—solubility in alcohol, Lafean. xxix, 324; water, ether, Regnault. xxiii, 412; chloroform, Hesse. xxiii, 406—concentrated solution, Reynolds. xxix, 75—conc. ethereal sol. for hypodermic inject. xix, 229—separat. fr. STRYCHNIA, Dwars. xxviii, 327—substitute, bebeeria the only reliable, Husemann. xxvi, 580; extr. of olive leaves, capsicum (Orient), Landerer. xxvi, 582—red color with spir. aeth. nitr., ammon., chlor. iron, due to acet. ac., Maisch. xxi, 370—taste covered, elix. wild cherry comp. xxiii, 51.

— TEST: (water, am., ether), Hesse. xxvii, 499—(iodosulph. chinoid.), Vrij. xxiv, 348, 9; xxix, 328; xxx, 408, 9—(thalleioquine), Trimble. xxvi, 575; Zeller (bromine). xxix, 328; in diluted solut., Challice. xxvii, 503—see also ESTIMATION—detect in urine, Vitali and Salkowski. xxiii, 413.

— See also QUININE, SULPHATE.

— SALTS, extemporaneous. xxvii, 503.

— ARTIFICIAL, Maumené. xxx, 407.

— "β" of Von Heiningen. xxiii, 399—identical with quinidia. xxvi, 583.

— INDIAN, crude alkaloids. xxv, 305.

— and AMMONIA preparations (see under LIQUOR; TINCTURE), McIntyre. xxv, 90.

— ARSENIATE, Dutch Phar. Soc. xxx, 414.

— BIHYDROBROMATE, Bullock. xxiii, 705, 6—xxviii, 374.

— BIMURIATE, for hypodermic inject., Vitali, xxviii, 327; xxix, 374.

— BINIODATE, Bauer. xxiii, 407.

— BISULPHATE, Hesse. xxiii, 397—Dutch Phar. Soc. xxx, 412—solubility in alcohol, Candidus. xxx, 565.

— with BILIARY ACIDS, de l'Arbre. xxi, 371.

— and BISMUTH. IODIDE, Fletcher. xxvii, 506.

— BROMIDE. See Q. HYDROBROMATE.

— CARBOLATE, Jobst. xxiii, 415; xxiv, 349—extemporaneous. xxvii, 504.

— and CINCHONIA IODIDE, Bauer. xxiii, 407.

— CITRATES, Mandelin. xxviii, 328—extemporaneous. xxvii, 504.

— CITRO-THYMOLATE, Pavesi. xxvi, 579.

— DIHYDROXYL, Kerner. xviii, 261.

— FERROCYNHYDRATE, Phar. Soc. Paris. xxvi, 577.

— HYDROBROMATE (BROMIDE), Boille. xxiii, 413; Bullock. xxiii, 705, 6; Ledger. xxix, 330; McDonald. xxi, 370; Thompson. xxv, 304; extemporaneous. xxvii, 504; Phar. Soc. Paris. xxvi, 577—hypodermic use, Whittaker. xxix, 330.

— HYDROCHLORATE. See Q. MURIATE.

— HYDROCYANATE, does not exist, Flückiger. xxi, 370.

— HYDRIODATE, Bauer. xxiii, 407—extemporaneous. xxvii, 504.

— HYPOPHOSPHITE, extemporaneous. xxvii, 504.

Quinine IODATE. xxx, 474.

- IODIDE, Bauer. xxiii, 407. See also Q. HYDRIO-DAIE.
- IODO-MERCURIATE, Jackson and Payne. xxx, 399, 400.
- IODURE D'IODHYDRATE, Bouchardat is herapathite xxx, 414.
- and IRON CITRATE, see IRON AND QUINIA CITRATE.
- ISOVALERIANATE, Schmidt. xxvii, 458. See also Q. VALERIANATE.
- KINATE for hypodermic inject., Collier. xxvii, 505.
- LACTATE for hypodermic inject., Sharp. xxii, 377—extemporaneous. xxvii, 504.
- MECONATE, Austen. xxii, 269.
- MURIATE, hypodermic solut., Powers. xxvii, 93—contain. (6 p. c. sulph.), Louis. xxi, 498—prep., Rother. (chlor. sod. alcohol) xxx, 412—formiat. of a double cpd with nitrate silver, Vulpius. xxx, 413—prop., Hesse. xxiii, 398—is preferable to the sulph., Voltz. xxii, 269.
- NITROPRUSSIDE, Davy. xxix, 325.
- OLEOSTEARATE, Harlingen. xxii, 243.
- PENTAIODIDE, Bauer. xxiii, 408.
- and PHENOL COMPS., Jobst and Hesse. xxiv, 349.
- PHENOL-BROMHYDRATE;—Q. PHENOL-CHLORHYDRATE, Jobst and Hesse. xxiv, 350.
- PHOSPHATE, extemporaneous. xxvii, 504.
- PICRATE, Masse. xxi, 379.
- PROPIONYL-, Hesse. xxix, 331.
- and QUINIDIA CPD (fr. cuprea bark), Wood and Barret. xxx, 413.
- SALICYLATE, physiol. effect., James. xxix, 314—prep., prop., Jobst. xxiii, 414; xxiv, 349.
- , SULPHO-CARBOLATE (-PHENATE), Rademaker. xix, 229, 230—Jobst and Hesse. xxiv, 350. See also Q. SULPHATE, CARBOLIZED.
- SULPHO-TARTRATE for hypodermic use, Prenalgeber. xxviii, 330.
- SULPHO-VINATE, Jaillard. xxiii, 415.
- SULPHATE, act. of sulph. ac. and sugar, Hamlin, Jr. xxix, 325—administration, Delieux. xxi, 378—ADULT. xix, 345; mur. cinchonia (spurious Pelletier). xix, 230; xxi, 100; xxiii, 520; (cinchonidia). xxii, 316; (33 p. c. water). xxii, 316; (sulph. sodium). xxi, 378, 498; (carb. sod.). xxiii, 520—detect. of sulph cinchonidia (fract. cryst.), Paul. xxv, 304—drug market. xix, 393; xx, 117, 143, 144; xxi, 432; xxii, 639; xxiv, 398; xxv, 340, 3, 6; xxvi, 650; xxvii, 553, 560, 6, 8; xxviii, 374; xxix, 374; xxx, 470—fluid volume, Candidus. xxvii, 709—hypodermic sol., Powers. xxvii, 93; Sharp. xxi, 96—precipit. by iod. pot. in pres. of chlor. iron, Maisch. xix, 230—prop., Hesse. xxiii, 397—purified, Prescott and Thum. xxvi, 828—test for salicin, Panot. xviii, 261—solubil. in alcohol, Candidus. xxx, 565; in water, chlorof., Hager, Hesse, Hejningen, and others. xxvi, 829; in glyc., Farley. xxviii, 285—taste masked (coffee, chlorof.), Hager. xxi, 378—TESTS of purity: Kerner (details). xxix, 329; Lindeman (precaut. with Kerner's). xxiv, 349; How (sulph. ac., ferric chlor.). xxvi, 561; Rump (modif. of Hesse's quinometr. test). xxviii, 326—see also under QUINIA—therapeut. value, Bourru. xxix, 332—water of cryst., Albers. xxii, 316; Dwers. xxvii, 493; loss at ordinary temp., Cowley. xxv, 303; with wine equival. water., Oudemans, Jr. xxii, 269. See also QUINIA.
- SULPHATE, "LIGHT" (fr. London) = mur. cinchonia, Strehl. xviii, 261; xix, 346.
- SULPHATE, SOLUBLE, in crystals, Dondé. xxi, 378.
- SULPHATE, R. INDIAN. xxx, 407.
- SULPHATE "FRENCH," is often mur. cinchonia. xix, 346.
- SULPHATE, CARBOLIZED, Cotton. xxiv, 350.
- "SWERT," discussion. xxiv, 663.
- TANNATE, estimat. of commercial, Jobst. xxvi, 578—is of variable constitution (definite quantit. of both quin. and tannin ought to be used), Jobst. xxvi, 579—cost of homemade. xx, 206—as substit. for sulphate, Sistack. xxi, 379—ninetenths found in urine and faeces, Hager. xxi,

Quinine. (Continued.)

- 379—Diehl (Rozsnyay's best). xxiv, 33—prep. Dutch Phar. Soc. xxx, 414; Phar. Soc. Paris. xxvi, 577; (colorless), Regnault. xxiii, 414; Rozsnyay. xxiii, 414; (tasteless), Berwick. xxvi, 378.
- TUNGSTOBORATE, Klein. xxx, 302.
- and UREA MURIATE (CHININ. BIMUR. CARBAMIDAT.), Drygin. xxvii, 504.
- VALERIANATE (see also Q. ISOVALER.), adult., Landerer. xxiii, 414; xxiv, 417—cost of homemade. xx, 206.
- Quinine bush = *Garrya Fremontii*, California. xxvii, 611.
- flower = *Sabbatia Elliottii*, Southern States. xxv, 147.
- Quiniometer, Hesse. xxvii, 500.
- Quiniretin, by act. of sunlight upon quinia, Flücker. xxvi, 576.
- Quinium, see CHINIUM.
- Quinoa SEED, see CHENOPODIUM QUINOA.
- Quinoidia, see CHINOIDIA.
- Quinolin, see CHINOLIN.
- Quinone, see CHINONE.
- Quisqualis INDICA, Mauritius. xxiv, 741.
- Quivisia HETEROPHYLLA, Mauritius. xxiv, 741.
- Quat = *Aplotaxis auriculata*, Arabia. xxvi, 225.

R.

- Rabi = seeds of *Abrus precatorius*, as weight in India. xxiv, 192.
- Rachat LAKUMIA, Turkey. xxiv, 68.
- Radcliffe, SEVEN SEALS, analysis, Hager. xxiv, 421.
- Radix ARTHANITÆ, fr. *Cyclamen*, *Europæum*. xxv, 134.
- BRUSCI, fr. *Ruscus aculeatus*. xxix, 102.
- CHINENSIS ALBA. xxi, 501. See also CHINA ROOT (the fungus).
- Radway's READY RELIEF, analysis, Pierron. xxiv, 421.
- Raffinose, fr. molasses, Loiseau. xxv, 288.
- Ragged cup = *Silphium perfoliatum*, use by the Indians. xxi, 619.
- Ragout powder = Curry powder. xxviii, 93.
- Ragwort, golden = *Senecio aureus*, Kansas. xxix, 442.
- Raisins, California. xxix, 196—product. in Malaga, Marsden. xxx, 218.
- Raiz DE BALESTERA = *Veratrum album*, Spain. xxvi, 592.
- DEL INDIO (a spec. of *Polygonum*), Mexico, analyzed, Voelcker. xxiv, 131.
- DE JERVA = *Veratrum album*, Spain. xxvi, 592.
- DEL MANSO = *Echinacea heterophylla*, Mexico. xxiv, 775.
- DEL MORO, Manilla. xxiv, 767.
- Raja jeera = seeds of *Corchorus trilocularis*, India. xxvi, 163.
- Rajania SUBAMARATA, Mexico. xxiv, 770.
- Ramsperger, *Gustavus*, butter cacao. xxiv, 527.
- discussion: xxii, 502, 528, 532, 533.
- Ramteel = *Guizotia oleifera*, India. xxvii, 179.
- Ran-oboli = *Justicia ecbolium*, India. xxviii, 125.
- Ran Turai = *Luffa amara*, India. xxv, 200.
- Randia DUMETORUM, India. xxiv, 725—descript., Dymock. xxv, 164.
- Ranunculaceæ. xviii, 287; xix, 264; xxi, 232; xxii, 125; xxiii, 179; xxiv, 156; xxv, 171; xxvi, 250; xxvii, 196; xxviii, 161; xxix, 170; xxx, 210; of California. xix, 298; Kansas. xxix, 440.
- Ranunculus CALIFORNICUS. xix, 298.
- Raphidophora PINNATA, Fiji. xxx, 147; — R. VITIENSIS. xxviii, 199; xxx, 146, 7.
- Ras-el-hanout (a spice mixture), Algiers. xxv, 228.
- Rase = resin fr. *Pinus halepensis*, France. xxvi, 323.
- Raspberry, see also RUBUS IDÆUS.
- LEAVES, p. c. of ash. xxii, 137—analysis of wild and cultivated BERRIES, Seiffert. xxviii, 181.
- BLACK = *Rubus occidentalis*, Kansas. xxix, 450.
- Rat poison. See also PHOSPHORUS PASTE.
- (barium carb.). xxviii, 91—(ricinus seed, squills,

- Rat poison.** (*Continued.*)
calabar beans), Hager. xxvi, 156—(fried sponges) Schultz. xxiii, 116.
- Ratanhia** (Goa) root of a spec. of *Leea*, India. xxvi, 163.
- **GRANATENSIS**=*Savanilla rhatany* fr. *Krameria tomentosa*, descript., Flückiger. xxiv, 179.
- See also **KRAMERIA**; **RHATANY**.
- Rattlesnake master**=*Eryngium yuccifolium*, Kansas. xxix, 452.
- Rattleweed**=a spec. of *Astragalus*, California. xxvii, 247, 611.
- Reader**, appointment proposed, Sloan. xxviii, 498.
- Reagent.** See **TEST**.
- **BOTTLE** (avoiding exposure to the air), Ridout. xxii, 46.
- Receiver, CONTROLLING** (in distillation), Mohr. xxv, 51.
- Red, MONAS-**, fr. *Monas prodigiosa*, Helm. xxiii, 459.
- **THALLIUM-**, Salter. xxvi, 423.
- **THAMUS-**, fr. fruit of *Thamus communis*, Hars-ten. xxiii, 459.
- Red bud**=*Cercis canadensis*, Kansas. xxix, 447.
- Red gum tree**=*Eucalyptus rostrata*. xxi, 249.
- Red root**=*Lachnanthes tinctoria*;—**R.**, **NARROW LEAVED**=*Ceanothus ovalis*, Kansas. xxix, 450.
- Redwoods**, California. xxvii, 603.
- Reducing substances**, test paper, Mohr. xxii, 51.
- Regianin** in rind of walnuts, Phipson. xix, 293.
- Rehan**=*Myrtus communis*, Malta. xxvi, 167.
- Rehmannia CHINENSIS**, China. xxiv, 747.
- Relbum**=*Galium chilense*, Chili. xxiv, 766.
- Remij(g)ia BERGENIANA**; **R. CUJABENSIS**, Brazil. xxx, 200;—**R. DENSIFLORA**, Guiana. xxx, 201;—**R. FERRUGINEA**, Brazil. xxx, 200; cont. viel-rina. xxvii, 182;—**R. FIRMLA**;—**R. HILAIRII**;—**R. HISPIDA**;—**R. MACROCNEMLA**;—**R. PANICU-LATA**, Brazil, xxx, 200, 201—**R. PEDUNCULATA**, Brazil, xxx, 200; yields *Cuprea*. xxx, 199;—**R. PURDIEANA**, yields *Cuprea*. xxx, 199;—**R. TENUI-FLORA**, Brazil. xxx, 201;—**R. VELOZII**, descript., analysis, Vogel; Nowak. xxii, 123.
- Remington, F. P.**, acid phosph. dilut. xxiii, 670—ac. tartaric. xxi, 90—benzin for exhausting oleo-resinous drugs. xxi, 592; xxii, 536—powd. blue mass. xxii, 527—cachets de pain. xxiii, 614—chairmanship of committee on adult. xix, 52—citric ointment. xxix, 507, 8—cosmoline, rancidity. xxv, 522—creasote. xx, 66—powdered extracts. xxix, 524—glycerin. xviii, 70, 187; xix, 539—fluid extr. glycyrrhiza. xxvi, 756—hydro-bromic ether. xxv, 454—on nominations. xxviii, 555—ointment boxes. xxi, 78—oleates. xxv, 521—American opium swindle. xxii, 558; xxiv, 531, 691—percolation. xxvii, 787—petroleum ointment. xxix, 506—elegant pharmacy. xxii, 503—compressed pills. xxiii, 624—ready-made pills of our days. xxiii, 620—on discretionary publication of papers. xxvii, 789—on queries not being answered. xx, 54—report on adult. xix, 350—report Centennial exhibition, xxiv, 711; xxv, 312—suppositories. xxii, 503—tartar emetic. xix, 529—keeping of distilled waters. xxi, 98.
- discussions. xviii, 70, 71, 78, 110, 111, 123, 124; xix, 52, 60, 110; xx, 55, 56, 66; xxi, 78, 90, 98; xxii, 503, 505, 510, 513, 514, 515, 518, 524, 525, 527, 529, 536, 539, 542, 554, 558, 559, 566, 572; xxiv, 596, 658, 659, 663, 664, 691; xxv, 512, 515, 521, 522, 528, 536, 545, 554, 555, 556, 558, 560, 569, 571; xxvii, 763, 782, 787, 790, 791, 792, 800, 802; xxviii, 509, 510, 511, 530, 531, 532, 533, 536, 537, 538, 539, 544, 545, 548, 555, 559, 560, 563, 564, 567, 568, 569, 570, 572, 573; xxix, 566, 507, 508, 510, 515, 520, 524; xxx, 596, 597, 616, 619, 620, 623, 624, 625, 630, 631, 647, 648, 650, 657, 658, 663, 664, 665.
- Ren-nikh**=*Nelumbium speciosum*, Japan. xxviii, 115.
- Rennet FERMENT**, Hammarsten. xxiii, 469.
- **LIQUID**, Mattison. xxiii, 488—**Soxhlet**. xxvi, 122.
- identity with **PEPSIN**, Cl. Parrish. xix, 511.
- Repercolation**, details, Rother. xix, 316—whether suitable for retailers, Squibb. xviii, 102—details, Squibb. xxvi, 97, 708, 710, 725, 734.
- Reply to queries**, earlier publications, Maisch. xxi, 42; discussion. xxi, 81; xxii, 521; xxiii, 792—neglect to. xviii, 67; xx, 54.
- Report, NEGLECT TO**, resolution. xviii, 96.
- Reports of Committees:**
ADULTERATIONS and SOPHISTICATIONS. xix, 59, 330; xxi, 474; xxii, 305; xxiii, 494; xxiv, 403; xxv, 352.
- ARRANGEMENT FOR 1876.** xxi, 65, 6, xxiv, 571, 2.
- AUDITING TREASURER'S ACCOUNT.** xviii, 72; xix, 62; xx, 53; xxi, 72; xxii, 515; xxiii, 815; xxiv, 678; xxv, 539; xxvi, 905; xxvii, 795; xxviii, 561.
- BUSINESS** (about COUNCIL). xx, 36.
- BY-LAWS.** xxiv, 600, 655; xxviii, 529.
- CENTENNIAL EXHIBITION.** xxiv, 711; xxv, 362.
- CENTENNIAL FUND.** xxvi, 876; xxvii, 809; xxviii, 553.
- CONSTITUTION.** xviii, 51.
- CREDENTIALS.** xviii, 18; xix, 28, 46; xx, 27; xxi, 33; xxii, 464; xxiii, 751; xxiv, 576, 597; xxv, 482, 500; xxvi, 853; xxvii, 756; xxviii, 506; xxix, 487; xxx, 593.
- representative DELEGATIONS.** xx, 110.
- admitting DELEGATES** fr. **GEORGETOWN COL-LEGE of PHARMACY**, Washington. xx, 69.
- admitting DELEGATES** fr. **MICHIGAN SCHOOL OF PHARMACY.** xix, 47.
- DRUG MARKET.** xix, 388; xx, 114, 142 (Phila-delphia); xxi, 420, 443 (Pittsburg), 447 (Cincin-nati), 448 (New Orleans), 449 (Baltimore); xxii, 496, 615, 642 (Baltimore); xxiv, 393, 401 (San Francisco); xxv, 335 (Canada), 343 (St. Louis), 344 (New York); xxvi, 645; xxvii, 549, 562 (San Francisco); xxviii, 367; xxix, 370; xxx, 461.
- EBERT PRIZE.** xxiii, 782; xxiv, 601; xxv, 509; xxvi, 875; xxviii, 527; xxix, 494; xxx, 623.
- ELIXIRS.** xxi, 90; xxiii, 489, 784.
- EXECUTIVE.** xviii, 22; xix, 37; xx, 30; xxi, 39; xxii, 468; xxiii, 761; xxiv, 581; xxv, 485; xxvi, 856; xxvii, 764; xxviii, 516.
- EXHIBITION** (specimens). xviii, 298; xix, 375; xx, 168; xxi, 421; xxii, 322; xxiii, 526, 817; xxv, 377; xxvi, 698; xxvii, 678; xxviii, 375; xxix, 397; xxx, 500—about discontinuing. xxvi, 878.
- JULIUS FEHR's complaint.** xxiv, 618.
- FINANCES.** xxx, 607.
- UNOFFICIAL FORMULAS.** xix, 69, 350; xx, 72; xxi, 64, 114; xxii, 338; xxiii, 487.
- DECENNIAL INDEX.** xix, 97.
- INTERNATIONAL PHARM. CONGRESS.** xix, 70.
- LEGISLATION.** xviii, 54; xix, 70, 353; xx, 145; xxi, 505; xxii, 329, xxiii, 541; xxiv, 429; xxv, 380; xxvi, 662; xxvii, 659; xxviii, 526, 578; xxix, 375; xxx, 474.
- LIEBIG'S MEMORIAL.** xxiii, 795; xxiv, 605.
- LIQUOR LICENSE.** xix, 86; xx, 29.
- MAXIMUM DOSES.** xxiii, 805, 6; xxiv, 603.
- MEMBERSHIP.** xxvii, 783; xxviii, 527; xxix, 494; xxx, 610.
- METRIC WEIGHTS and MEASURES.** xxiv, 423, 606.
- NOMINATION.** xviii, 48; xix, 120; xx, 45; xxi, 54; xxii, 491; xxiii, 759; xxiv, 594; xxv, 500; xxvi, 870; xxvii, 770; xxviii, 512, 571; xxix, 491; xxx, 600.
- PHARMACOPŒIA** (permanent). xxi, 76; xxv, 545, 552, 553.
- PHARMACOPŒIA REVISION** xxvi, 668; xxvii, 667.
- PHARMACOPŒIA REVISION** (publication). xxviii, 528, 561.
- PHOTOGRAPH ALBUM.** xix, 62; xx, 56; xxi, 87; xxii, 551; xxiii, 781.
- POWERS' MEMORIAL.** xxvi, 916.
- PRESIDENT'S ADDRESS.** xviii, 108; xx, 74; xxi, 80; xxii, 516, 8; xxiii, 808; xxiv, 674; xxv, 526; xxvi, 907; xxvii, 793; xxviii, 548; xxix, 517; xxx, 642.
- PRIZE ESSAYS**, see **EBERT'S PRIZE**, *supra*.
- PROGRESS of PHARMACY**, editorship. xxi, 35, 6, 8.
- PUBLICATION.** xxix, 500; xxx, 606.
- PUBLICATION IN ADVANCE.** xxiii, 790, 1.

Reports of Committees :

QUERIES. xviii, 58; xix, 54; xx, 105; xxi, 103; xxii, 568; xxiii, 825; xxiv, 693; xxv, 573; xxvi, 918; xxvii, 807; xxviii, 575; xxix, 525; xxx, 666.
 SECRETARY'S REPORT. xxiii, 809; xxvii, 794.
 See also REP. COM. ON PRESIDENT'S ADDRESS.
 SPECIMENS, see EXHIBITION.
 TENNESSEE COLLEGE OF PHARMACY. xxiv, 609.
 TIME AND PLACE of meeting. xviii, 105, 116; xix, 96, 107; xx, 97, 8; xxi, 86; xxii, 538; xxiii, 823; xxiv, 670; xxv, 515; xxvi, 894; xxvii, 804; xxviii, 549; xxix, 525; xxx, 630.
 WAYS and MEANS. xxvi, 888.

Reports of :

COUNCIL. xxix, 489; xxx, 603.
 PROGRESS OF PHARMACY, principles of classification, Diehl. xxi, 418—(Mahla). xviii, 202—(Wenzell). xix, 129—(Mercein). xxi, 125—(Diehl). xxi, 151; xxii, 25, 550; xxiii, 25; xxiv, 25; xxv, 25; xxvi, 25; xxvii, 25; xxviii, 25; xxix, 25; xxx, 25.
 PERMANENT SECRETARY. xviii, 25; xix, 40; xx, 31; xxi, 41; xxii, 470; xxiii, 769; xxiv, 588; xxv, 496; xxvi, 865; xxvii, 773; xxviii, 522; xxix, 502.
 TREASURER, not to be read before the second session, Sander. xx, 44—xviii, 41; xix, 48; xx, 48; xxi, 56; xxii, 494; xxiii, 776; xxiv, 597; xxv, 504; xxvi, 873; xxvii, 778; xxviii, 524; xxix, 513; xxx, 608.

Reseda LUTEOLA, spheroids in leaves. xxvii, 443—cultivat. in Australia. xxviii, 100; France. xxiv, 823; xxvii, 382.

Resins, emulsifying, Greenish. xxv, 91; Phar. Soc. Paris. xxv, 92—solubilities, Sacc. xviii, 272; xix, 310—sp. gr., Hager. xxvii, 422—distinctive tests, Hirschsohn. xxvi, 449—466—of India, Centennial exhibit. xxiv, 718—of Mexico, Centennial exhibit. xxiv, 767.

Resin (ROSIN), detect. in beeswax, Schmidt. xxvii, 434—products of distillation, Renard. xxix, 286—in Canada. xxv, 338—Florida, Georgia. xxvi, 327—separat. fr. soap, Wolff. xxviii, 289—solubilities, Sacc. xix, 310—solubility in eucalyptus oil. xxvii, 234—sp. gr., Hager. xxvii, 424; Dieterich. xxx, 363.

—, WINDOW-GLASS. xxix, 325.

—SPIRIT, constituents, Tichborne. xix, 271.

—WREDS=Grindelia, California. xxvi, 698—=Silphium laciniatum, Kansas. xxix, 442.

—JALAP, examin. of commercial, Farwell. xxvii, 77—prop.; solubility, Köhler and Zwicke. xviii, 278—test for guaiac, Blacher. xviii, 278—yield, Keeler. xxviii, 130; Wrenn. xxx, 175.

—LEPTANDRA, cause of variable color, Lloyd. xxviii, 421—prep., Lloyd. xxviii, 423. See also LEPTANDRIN.

—PHOSPHORETTED, see PHOSPHORETTED RESIN.

—PODOPHYLLUM, see PODOPHYLLIN.

—SCAMMONIUM, see SCAMMONIUM.

Resina GUAIACI PERUVIANA AROMATICA, analysis, Kopp. xxv, 174—behavior to reagents, Hirschsohn. xxvi, 453-9.

—LARICEA;—R. LARIGNA = Venice turpentine. xxvi, 321.

—PINI EMPYREUMATICA = Woodtar. xxvi, 325.

—STORACIS CALAMITA, descript., Möller. xxiii, 158, 9.

—THAPSIÆ, prep., Godeffroy. xxii, 124.

—VERATRI VIRIDIS, Mitchell. xxii, 411.

Résine DE L'ARBOL À BRÉA, Manilla, Hanausek. xxvi, 257;—R. BLANCHE;—R. COMMUNE (galipot). xxvi, 324.

Resinoids, examin. of commercial, Beach, Little. xxiv, 413; xxv, 96.

Resolutions : (see also MOTIONS.)

Committee on ADULTERATIONS and sophisticat. xviii, 111.

Appointment of AGENTS to collect dues. xviii, 113.

Committee of ARRANGEMENT FOR 1876. xix, 76, 7.

BADGE. xxiii, 805.

Amendment of BY-LAWS. xxiii, 825.

Adding CENTIGRADE to weather report; and stamp COINS with weight in grams and grains. xxvi, 887.

Resolutions : (see also MOTIONS.)

Revise list of societies to whom COMPLIMENTARY COPIES are sent. xix, 99.

COUNCIL. xix, 113, 9.

DELEGATES to nominate on permanent pharmacop. xix, 82; xxi, 92.

Annual DUES to be remitted to certain members. xix, 97.

Committee on ELIXIRS and UNOFFICIAL FORMULAS. xx, 111.

ELIXIRS, to recommend. xxi, 92.

ELIXIRS of Chicago Coll. Pharmacy. xxii, 562, 4.

To record HEROISM of pharmacists during yellow fever epidemic. xxvi, 917.

GENERAL INDEX. xviii, 112, 3.

Invitation to INTERNATIONAL PHARM. CONGRESS to meet in U. S. xviii, 114.

Person to represent the Assn. at the INTERNAT. PHARM. CONGRESS at St. Petersburg. xix, 97.

INTERNATIONAL PHARMACOPŒIA. xxi, 519.

A definite sum for EUROPEAN JOURNALS. xviii, 110.

Committee on LEGISLATION. xviii, 114.

LIQUOR LICENSE. xix, 87; xxii, 545.

MAXIMUM DOSES. xxii, 520; xxiii, 807.

MEETING in the SOUTH in spring months. xxvi, 909.

Increase of MEMBERSHIP. xxiii, 522.

Qualifying for MEMBERSHIP. xxvii, 770.

METRICAL WEIGHTS and MEASURES. xxiii, 822, 841.

NEGLECT to REPORT. xviii, 96.

NORTH GERMAN APOTHECARIES' ASSN., felicitation. xviii, 115.

PAPERS to be read only in the abstract. xix, 93.

Mention at PATENT APPARATUS. xxii, 572.

Permanent committee on PHARMACOPŒIA. xix, 82; xxi, 92.

PHARMACOPŒIA REVISION. xxiv, 629; xxv, 534, 9, 554.

PHARMACOPŒIA REVISION expenses. xxvii, 797.

PHARMACOPŒIA of U. S. to be sent to the corresponding societies of the Am. Ph. Assn. xx, 95.

On resolut. of College of Physicians, Philadelphia, about POISONS. xx, 75.

PORTRAITS to be inserted in Proceedings. xxii, 520.

Repetition of PRESCRIPTIONS by physicians in Denver (Col.). xxi, 142.

Reading of PRESIDENT'S ADDRESS after appoint. of com. on credentials. xxii, 522.

Committee on PRESIDENT'S ADDRESS to consist of five members. xviii, 39.

Death of W. PROCTER, JR. xxii, 537.

Permanent reporter on PROGRESS of PHARMACY. xx, 96.

Committee on PROGRESS of PHARMACY. xviii, 62.

Foreign PROPRIETARY MEDICINES be excluded fr exhibitions. xxii, 572.

Omitting portions of the PHONOGRAPHIC REPORT. xix, 119; xxiv, 667.

PUBLICATION in ADVANCE. xxii, 521; xxiii, 792.

QUERIES to be dropped. xx, 103.

SINKING FUND. xx, 86.

STAMP ACT, repealing. xxviii, 562.

STEWARDS OF THE ARMY AND NAVY. xxx, 659.

SUSPENSION OF PARLIAMENTARY RULES. xix, 93.

TENNESSEE COLL. OF PHARMACY. xxiii, 830, 8.

TREASURER to borrow money. xviii, 108.

TREASURER to honor draft of local secretary. xx, 95.

Resorcin, antiseptic and therapeutical value, Andeer. xxix, 300; Dujardin-Beaumetz. xxx, 354—drug market. xxix, 374; xxx, 474—prep., Power. xxix, 300.

Resticaceæ. xxx, 148.

Retamilla, Arg. Republ. xxiv, 762—= Linum ramosissimum, Chili. xxiv, 766.

Reten (fr. dry distill. of wood), Ekstrand. xxiv, 272.

Retort with condenser (of glass) in one, Bartlett. xxx, 45.

—residue removed, Lehmann. xix, 137.

- Retortuño, Arg. Republ. xxiv, 762.
 Retzinato=pitch wine, Greece. xxvi, 327.
 Retzinolektes=pitch collector, Greece. xxvi, 327.
 Retzinotomari=pitch plaster, Greece. xxix, 68.
 Revenue, law, penalty for not stamping. xix, 100.
 Rewarewa = *Knightsia excelsa*, New Zealand. xxiv, 737.
 Rew-tang-soh=*Gentiana Buergeri*, Japan. xxviii, 134.
 Rhabdothermus SOLANDRI, New Zealand. xxiv, 737.
 Rhamnaceae. xviii, 286; xix, 270; xxi, 258; xxiii, 219; xxv, 220; xxvii, 262; of California. xix, 300; Kansas xxix, 450.
 Rhamnegin, coloring matter of Persian berries. xviii, 286—identical with Xanthorhamnin, Schützenberger, Liebermann. xxvii, 264.
 Rhamnetin fr. Xanthorhamnin. xxvii, 265.
 Rhamnodulcite, Liebermann and Hörmann. xxvii, 265.
 Rhamnus CATHARTICUS, see also BUCKTHORN—and Rh. *Frangula* different react. of the juice. xxiii, 220—cultivat. in Asia Minor, Stöckel. xxi, 258.
 —CHLOROPHORUS, China. xxv, 235;—RH. CROCEA, California. xxvi, 698; xxvii, 666.
 —FRANGULA, see FRANGULA.
 —INFECTORIA, analysis of berries. xviii, 286; Stein. xix, 270; Liebermann and Hörmann. xxvii, 264.
 —LANCEROLATA, Kansas. xxix, 450;—RH. SOPORIFERA, China. xxiv, 730.
 —PURSHIANA, chem. and microscop. examin., Prescott. xxvii, 262—pharm. prep., Kennedy. xxviii, 431—California. xxvi, 698, 707; xxvii, 607.
 —UTILIS, China. xxv, 235.
 Rhatanin, Ruge. xxiii, 60.
 Rhatany, see also KRAMERIA—adult. of powd. xxx, 576.
 —BRAZILIAN=Ceará or Para rhatany, fr. *Krameria argentea*. xxiv, 179.
 —CEARÁ=Para or Brazilian rhatany, fr. *Krameria argentea*, Flückiger. xviii, 289; xxiv, 178.
 —PARA=Ceará or Brazilian rhatany fr. *Krameria argentea*. xviii, 289; xxiv, 179.
 —PAYTA=officinal, fr. *Krameria triandra*. xxiv, 178.
 —SAVANILLA = *Rhatania granatensis*, fr. *Krameria tomentosa*. xviii, 289; xxiv, 179.
 —difference in color between Ceará-, Para-, Payta-, Savanilla rhatany, Flückiger. xxiv, 178.
 —three diff. kinds. xviii, 289.
 Rheum, see also RHUBARB.
 —ANGLICUM, act. of iodine, Greenish. xxvii, 150.
 —CHINENSE, analysis, Greenish. xxvii, 151—act. of iodine. xxvii, 150.
 —COLINIANUM, China. xxvii, 148.
 —EMODI, India, descript. and uses, Schlagintweit. xxix, 136.
 —LEUCORRHIZUM, India. xxix, 136—Turkestan. xxi, 213.
 —MANDCHURICUM, analysis, Greenish. xxvii, 151—act. of iodine. xxvii, 150—cont. no starch. xxvii, 149.
 —MOORCROFTIANUM, India. xxix, 136.
 —MUSCOVITICUM, act. of iodine, Greenish. xxvii, 150.
 —OFFICINALE, degeneration in European soil, Werner. xxix, 135—descript. Baillon. xxi, 211; Flückiger. xxiv, 129; of root, Holmes. xxvi, 198—identical with Rh. palmatum, Werner. xxvi, 196—comparison of powd., extract and infusion with East India and Rhapontic rhubarb, Senier. xxvi, 199—cultivat. at Banbury, Holmes. xxv, 133; at St. Petersburg, Beilstein. xxx, 156.
 —PALMATUM, act. of iodine, Greenish. xxvii, 150—cultivat. at St. Petersburg, Beilstein. xxx, 156—identical with Rh. officinale, Werner. xxvi, 196.
 —PALMATUM var. TANGUTICUM. xxiv, 130; degenerates in European soil, Werner. xxix, 135—produces Kiachta rhubarb, Maximovicz. xxiii, 145—descript., Balfour. xxvi, 197.
 Rheum RHAPONTICUM at Banbury. xxv, 132.
 —SIBIRICUM, analysis, Greenish. xxvii, 151—act. of iodine, Greenish. xxvii, 150.
 —SPICIFORME, India. xxix, 136.
 —TARTARICUM, India. xxix, 136.
 —UNDULATUM at Banbury. xxv, 132.
 —WEBBIANUM, India. xxix, 136.
 Rheumatism root=*Dioscorea villosa*. xxvi, 190.
 Rhinacanthus COMMUNIS, China. xxvii, 157—descript. and uses in India, Dymock. xxv, 141.
 Rhinanthin, Ludwig. xix, 290.
 Rhinanthus ALECTOROLOPHUS, analysis of seed, Ludwig. xix, 290.
 Rhizophora MANGLE, Jamaica. xxiv, 736—Mexico. xxiv, 776.
 Rhizophoreæ, Mexico. xxiv, 776.
 Rhode's FEVER AND AGUE CURE, analysis, Churchill. xxiv, 417.
 Rhode Island, pharmacy law. xviii, 309; xix, 353, 6, 9; xx, 146.
 Rhodium. xxiii, 317—act. upon formic ac. and alcohol, Deville and Debray. xxiii, 317—act. of oxygen, Deville. xxvii, 374.
 Rhododaphne=*Nerium oleander*, Greece. xxiv, 136.
 Rhododendron CALIFORNICUM. xix, 303;—RH. OCCIDENTALS, analysis, Troppman. xxx, 190.
 Rhœadina, history. xxi, 376.
 Rhœagina, history. xxi, 376.
 Rhubarb, FLOWERS, for rheumatism, Turkestan. xxii, 104.
 —, ROOT, practical remarks, etc., Diehl. xxvii, 36; Squibb. xviii, 97, 180; xix, 497; xx, 226—adult. of powder. xix, 338; xxx, 576, 8, 9; (corn meal and gamboge). xxi, 486; suspicious price. xxiv, 394—analysis, Greenish. xxvii, 150—examinat. of root grown at St. Petersburg, Beilstein. xxx, 156—degeneration in European soil, Werner. xxix, 135—drug market. xix, 398; xx, 127; xxi, 440; xxii, 640; xxvii, 580—gigantic root (26 lb; 16x12x7"). xxix, 135—insects attacking, Saunders. xxiii, 818; xxiv, 131—prevents starch react. of iodine, Husson. xxiii, 146—act. of iodine is not indicative of quality, but chiefly of presence of starch, Greenish. xxvii, 148—odor, Squibb. xxi, 74, 631—cont. fixed oil (up to 3 p. c.) Nesbit. xxx, 157—source, Baillon. xxi, 211; Flückiger. xxiv, 129; Langenthal. xxii, 102; Maximovicz. xxiii, 145; Schlagintweit. xxii, 103; Werner. xxvi, 30, 196—Overland route. xx, 65—how to make a nice looking powder, Squibb. xix, 498—test of good quality, Squibb. xix, 500—unreliability of tests for powdered, Squibb. xix, 497—TEST for purity of powder: Howie. xxii, 310; Maisch. xix, 292; xxi, 145; Opwyrd. xix, 291—aqueous extract represents the full activity, Buchheim. xxii, 104—(denied by Heinitsh. xxiii, 146.)
 —CULT. and COLLECT. in Austria. xxii, 167; select "Austrian" sold for "Turkey," Robbins. xviii, 99—Banbury, is a hybrid, fr. Rh. rhapont. and Rh. undulat.; account of cultivat., Holmes. xxv, 132; for adult, powd., Squibb. xix, 498—Chinese. xxiv, 748; comparat. analysis of Chinese and English, Dragendorff. xxvi, 200; fr. Rheum Colinianum, Baillon. xxvii, 148—"Dutch trimmed imitation" is Austrian rhubarb, Robbins. xviii, 98—India. xxix, 136—Java, Schmidt. xxvi, 199—Ootacamund. xxix, 115—Persian. xxix, 136—Thibetan. xxi, 212; account, Schlagintweit. xxii, 103—"Turkey." xxix, 136; is select Austrian. xviii, 99.
 Rhus, review of species, Burgess. xxix, 225—occurrence of crystals, Meyer. xxix, 227.
 —AROMATICA, microscop. and chemical examin., Harper. xxix, 227—therapeutic value. xxix, 226, 230—Kansas. xxix, 440.
 —AROMATICA, var. TRILOBA, Arizona. xxvii, 259.
 —COPALLINA, Africa. xxix, 226;—RH. CORIARIA (fruit cont. 17 p. c. tartar. ac.), Pfeil. xxii, 157—uses in Russia. xxix, 225;—RH. COTINUS (fustic). xxix, 225, 7;—RH. DIVERSILOBA, California. xix, 300; xxvi, 698; xxvii, 610, 612; poisonous. xxix, 226;—RH. GLABRA. xxix, 226; Kansas. xxix, 440. See also SUMACH;—RH. INTEGRIFOLIA, California. xxvii, 259;—RH. KAKRASINGHU. xxx, 247;—RH. LOBATA. xxix,

Rhus. (Continued.)

- 226;—RH. METOPIUM (hog gum), West Indies. xxix, 225;—RH. PERNICIOSA, Mexico. xxiv, 768;—RH. PUBESCENS, cont. crystals, Meyer xxix, 227;—RH. PUMILA, North Carolina, poisonous. xxix, 226;—RH. RADICANS. xxix, 226; Kansas. xxix, 440;—RH. SEMI-ALATA, China, Japan. xxiii, 120; xxix, 226;—RH. SUCCEDANEA. xxi, 257; xxvi, 295; xxviii, 294; xxix, 225, 7; see also WAX, JAPANESE;—RH. SYLVESTRIS, Japan. xxvi, 295; xxviii, 294.
- TOXICODENDRON, active principle similar to cardol., Buchheim. xxii, 34, 157—eruption: use fide xir. gelsemium, Bernard. xxv, 218; (efficacy denied by Johnson. xxv, 218); lime water, galvanism, Blackwood. xxix, 230; bromine, Brown. xxvii, 259; grindelias, Canfield. xxi, 257; oil sassafras, Neesen. xxx, 246—in Kansas. xxix, 440—uses. xxix, 226, 7.
- TRILOBATA. xxix, 226;—RH. TYPHINA, Canada. xxix, 226, 7;—RH. VENENATA, analysis, Cotton. xxiii, 218; cont. crystals. xxix, 226;—RH. VERNICIFERA, Japan. xxvi, 295; xxviii, 294; xxix, 225, 7;—RH. VILLOSA, cont. crystals. xxix, 227.
- Rice, Charles.** Oleate of mercury. xxii, 462—oleic acid. xxii, 460—melting point of petroleum. xxix, 430—report on adulterations. xxi, 474; xxii, 305—report on revision U. S. Ph. xxvi, 668—syrup. iodide iron. xxvi, 664—overwork in Ph. revision. xxvi, 879—resignation as chairman Ph. revision. xxvi, 879.
- discussions. xxiii, 754, 794, 821; xxiv, 624, 625, 643, 650, 664, 666, 675; xxv, 510, 553, 555.
- L. M., see ROYCE, L. M.
- Rice LIQUOR** (beer), Japan—Saké—. xxvii, 402
- PAPER PLANT = *Aralia papyracea*, Formosa. xxvii, 194.
- Rich weed** = *Pilea pumila*, Kansas. xxix, 452.
- Richardson, James.** Address. xxx, 598—purity of powd. drugs. xxx, 655.
- discussion. xxx, 598, 655.
- Richmond (Va.)**, drug market. xxvi, 646—pharmaceut. assn. suggested. xxi, 107—about prescriptions xxiii, 797.
- Ricin** (of Tuson) is not an alkaloid, Raab. xxviii, 193; an organic magnesium salt, Werner. xviii, 286—fr. leaves of *Ricinus communis*, Wayne. xxii, 158.
- Ricinus COMMUNIS**, analysis of LEAVES, Wayne. xxii, 158; Raab. xxviii, 193—SEEDS cont. cryst. albuminoids, Ritthausen. xxx, 449; analysis, Popp. xix, 293; Boerner. xxv, 225; collect. in California. xxiii, 222; poisonous, Husemann. xxvi, 305—cultivat. of plant in Illinois. xxvii, 266; in India. xxiv, 723—eighty years ago. xxvi, 849.
- Rickey, Randall.**, *Cinchona* alkaloids. xxiii, 644.
- Riddance salt** ("Abraum-salz") of Stassfurt. xxii, 186.
- Rindo** = *Gentiana Buergen*, Japan. xxviii, 134.
- Ringni** = *Solanum Jacquini*, India. xxviii, 120.
- Ringworm powder** = *Araroba*. xxiii, 213.
- Ringworm**, thymol ointment, Squire. xxvi, 90.
- Risha-i-kitmi** = root of *Althæa officinalis*, India. xxvi, 162.
- Ritha** = *Sapindus trifolius*, India. xxvi, 166.
- Rittenhouse, H. N.** ammoniacal glycyrrhizin. xxiv, 543—olive oil and adulterations. xix, 508—flexible gelatin plaster. xxi, 604—syrup senega. xix, 453.
- discussion. xviii, 68, 9.
- Riuno fige** = *Ophiopogon japonicus*, Japan. xxviii, 204.
- Riverius.** xxvi, 843.
- Robbins, Chas. A.** *Veratrum viride*. xxv, 439, 524.
- discussion. xxv, 524, 5.
- D. C. Adulterations, students' analyses. xxiv, 651—drug business in relation to medicine and pharmacy. xix, 409—rhubarb. xviii, 98.
- discussion. xviii, 98, 99, 100; xxiv, 651, 653.
- Roberts, Joseph.** Cantharidal collodion. xxv, 417 test for purity of chloral hydrate. xxiii, 707—chloral hydrate and camphor. xxv, 457—report exhibit. xxiii, 526.
- discussion. xxii, 521, 560, 561, 563; xxiii, 754, 818, 830, 831, 833, 836, 838; xxiv, 576, 622, 670, 1

Roberts, Jos. ph. (Continued.)

- 686; xxvii, 796; xxviii, 509, 510, 544, 545, 556, 557, 559, 560, 563, 564; xxx, 596, 626, 632.
- Robinia AMARA**, China. xxiv, 750—R. PSEUDACACIA, Kansas. xxix, 447;—R. VISCOSA, yield of glucose and saccharose. xxvi, 514.
- Rocella TINCTORIA**, California. xxvii, 574.
- Rochelle salt**, see SODIUM AND POTASSIUM TARTRATE.
- Rock brake** = *Polypodium incanum*, Kansas. xxix, 445.
- Rod wax** = Amorphous paraffin, Sheppard. xxx, 59.
- Roemelia FLORIBUNDA**, Mexico. xxiv, 768.
- Roll book**, first made in 1875. xxiii, 762.
- Roll call**, see MEMBERS PRESENT.
- Romerillo, Arg. Republ.** xxiv, 764—= *Asclepias linearis*, Mexico. xxiv, 773.
- CHILOTE = *Baccharis Patagonica*, Chili. xxiv, 765.
- Romero, Arg. Republ.** xxiv, 762—= *Baccharis rosmarinifolia*, Chili. xxiv, 766—= *Trichostemma lanatum*, Mexico. xxvii, 163.
- DEL CAMPO, Arg. Republ. xxiv, 763.
- Romesa** = *Rumex romesa*, Chili. xxiv, 765.
- Roots**, when to gather. xviii, 139.
- Roranshi** = a spec. of aconite, Japan. xxix, 173.
- Rorn mierr** = *Punica granatum*, Malta. xxvi, 167.
- Rosa BLANDA**, Kansas. xxix, 450;—R. DAMASCENA;—R. INDICA, India. xxvi, 282.
- Rosaceæ.** xxi, 251; xxii, 147; xxiii, 209; xxiv, 188; xxv, 204; xxvi, 281; xxvii, 239; xxviii, 178; xxix, 207; xxx, 235; of California. xix, 301; Kansas. xxix, 450; Mexico. xxiv, 776.
- Rosanilin ALUMS**, can not be formed, Wood. xxvii, 523.
- test for arsenic, Rickher. xviii, 250—with all nitrogen eliminated, Liebermann. xxii, 273.
- Rose LEAVES**, coloring matter, chemical react., and by spectroscope. Senior. xxv, 204—artificially colored, Greenish. xxix, 209—drug market. xix, 402; xxx, 471—loss in drying. xxi, 202—yield of glucose fr. petals, Boussingault. xxvi, 514.
- CULTIVATION in Australia. xxviii, 100—France. xxvi, 283—India. xxvi, 281—Turkey. xxiv, 289.
- Rose maloes**, resin, China. xxiv, 744.
- PRAIRIE, = *Rosa blanda*, Kansas. xxix, 450.
- Rose, Hy J.** Report exhibit. xxv, 377—tartaric acid of commerce. xxi, 651.
- discussion. xxvi, 880, 883, 899, 900, 910, 913.
- Rosemary** in Australia. xxviii, 100—cultivat. in Ootacamund. xxix, 115.
- Rosenwasser, Nathan.** Percolation. xxx, 519.
- discussion. xxx, 597, 619, 620, 622, 624, 625, 646, 647, 656.
- Rosia**, resembles sarsaparilla, use by Indians. xxi, 620.
- Rosin**, see also RESIN.
- , WINDOW-GLASS-. xxix, 235.
- weed, see RESIN WEED.
- Ross, George J.** xxvi, 894; xxvii, 795.
- Rother, R.**, syrup. scillæ co. xx, 217—syrup. senegæ. xx, 209.
- Rottlera TINCTORIA.** See KAMALA.
- Rottlerin**, presence in Kamala confirmed, Groves. xxi, 259.
- Roviseed**, fr. *Ervum ervilia*, Turkey. xxviii, 187.
- Roxburghia SESSILIFOLIA**, Japan, description, Holmes. xxviii, 110.
- Royce (Rice) L. M.**, morphia strength of tinct. opium. xix, 447—taraxacum. xxii, 551—discussions. xix, 108, 125; xx, 90; xxiv, 600, 677.
- Rozen** (rosin) 1810. xix, 494.
- Rubber**, India. See CAOUTCHOUC.
- Rubia CORDIFOLIA**, India. xxiv, 717—descript., Dymock. xxvii, 181.
- MANJISTA, China. xxiv, 746—India. xxiv, 717.
- TINCTORUM. See also Madder—coloring matter. xxii, 120.
- Rubiaceæ.** xviii, 280; xix, 277; xxi, 226; xxii, 120; xxiii, 168; xxiv, 144; xxv, 162; xxvi, 230; xxvii, 181; xxviii, 150; xxix, 161; xxx, 194; of California. xix, 302; Kansas. xxix, 450.
- Rubidium.** xxvi, 382; xxvii, 332—equivalent, Godeffroy. xxvii, 332.
- AURIC CHLORIDE;—R. CADMIUM CHLORIDE;—R. MANGANOUS CHLORIDE;—R. MERCURIC CHLORIDE; Godeffroy. xxvi, 382, 3.

- Rubidium SILICO-MOLYBDIC**, Parmentier. xxx, 302.
Rubidol (hydrocarbon fr. wood tar), Thenius. xxvi, 431.
Rubijervin (of Wright), Bullock. xxviii, 107.
Rubini's CAMPHOR. xxi, 614;—**R. TINCTURE**. xxi, 614.
Rubreserin (of Duquesnel). xxvi, 293.
Rubus CANADENSIS, Kansas. xxix, 450;—**R. CHAMMORUS**, coloring principle, Cech. xxix, 355; **R. IDÆUS**, probably of American origin, Areschoug. xxii, 147; use in China. xxiv, 752;—**R. MACROPETALUS**;—**R. NUTKANUS**, California. xix, 301;—**R. OCCIDENTALIS**, Kansas. xxix, 450;—**R. VILLOSUS**, microscopical structure, Johnson. xxx, 236; in Kansas. xxix, 450. See also **BLACKBERRY**.
Ruda, Arg. Republ. xxiv, 763;—=**Ruta bracteosa**, Chili. xxiv, 766.
Rudbeckia LACINIATA, Kansas. xxix, 442.
Rue. See **RUTA**.
Rui=**Calatropsis gigantea** and **C. procera**, India. xxviii, 139.
Ruibarbo, Arg. Republ. xxiv, 763.
Ruies, STANDARD (NORMAL), best alloy of iridio-platinum, Matthey. xxvii, 377.
Rum, comp., examin. of genuine and artificial, Beckurts. xxx, 337—test for purity, Wiederhold. xix, 241.
 — **ESSENCE**. xxx, 338.
Rumex CRISPUS;—**R. HYDROLAPATHUS**, Kansas. xxix, 449;—**R. HYMENOSEPALUS**, Arizona. xxvii, 148;—**R. SALICIFOLIUS**, California. xix, 305;—**R. SANGUINEUS**, Kansas. xxix, 449;—**R. VESARIUS**, India, descript., Dymock. xxviii, 117;—**R. VERTICILLATUS**, Kansas. xxix, 449.
Runas=**Rubia tinctorum**, Persia. xxvii, 161.
Runge's blue (chlorin. lime and anilin in excess), Perkins. xix, 222.
Ruscus ACULEATUS;—**R. HYPOGLOSSUM**;—**R. HYPOPHYLLUM**, xxix, 102.
Rush, HORSETAIL=**Equisetum arvense**;—**R. SCOURING**=**Equisetum hyemale**;—**R. TALL, BRANCHING**=**Equisetum robustum**, Kansas. xxix, 444.
Rusot, fr. **Berberis asiatica**, India. xxiv, 725; descript., Dymock. xxvi, 164.
Russia, chemicals, Centennial Exhibit. xxiv, 798—drugs, Centennial exhibit. xxiv, 780.
Russula VITELLINA cont. oxalic ac., Hamlet and Plowright. xxvi, 178.
Rust (iron) removed fr. white goods. xxviii, 98.
Rust, W. xxiii, 834, 836.
Ruta BRACTEOSA, Chili. xxiv, 766.
 — **GRAVEOLENS**, see also **OIL OF RUE**—in Canada. xxv, 336—germinat. of seed, Saunders. xxx, 567—uses in Malta. xxvi, 167.
Rutaceæ. xix, 268; xxii, 132; xxiii, 180; xxiv, 159; xxv, 174; xxvi, 251; xxvii, 206; xxviii, 167; xxix, 193; xxx, 213; of California. xix, 300; Kansas. xxix, 450; Mexico. xxiv, 777.
Rutanjot=**Onosma echioides**, India. xxiv, 717.
Ruthenium. xxvi, 428—act. upon formic ac. and alcohol, Deville and Debray. xxiii, 317—behav. to oxygen, Deville. xxvii, 374—prop., Deville and Debray. xxvi, 428.
Ruthenic oxide, Deville and Debray. xxvi, 428.
Rutland beauty=**Calystegia sepium**, Kansas. xxix, 443.
Ruttee SEED=fr. **Abrus precatorius**, India. xxx, 244.
Rutter, E. tasteless iron combinations. xxiii, 691.
Rye, contains zinc, Bellammy and Lechartier. xxvi, 400.
Rytiphlea PURPUREA, coloring matter. xxviii, 354.
- S.**
- Saa-ga-ban**=**Apios tuberosa**, use by Indians. xxvii, 258.
Saame and Co. exhibit. xxiv, 791.
Sabadilla, chemical history, Mitchell. xxii, 403.
Sabadillina, Weigelin and Tobien. xxvi, 593.
Sabal LEVISTONA, Southern States. xxvii, 139.
 — **SERRULATA**, descript. and uses, Read. xxvii, 139.
Sabardo=**Kleinia pteroneura**, Morocco. xxiii, 167.
Sabatrina, Weigelin and Tobien. xxv, 310; xxvi, 593.
Sabbatia ANGULARIS cont. erythrocentaurin, Hunnecker. xix, 287;—**S. CAMPESTRIS**, Kansas. xxix, 445;—**S. ELLIOTTII**, Maisch. xxv, 147.
Sabina, see **SAVIN**.
Sabzeiro=digger of sarsaparilla root, Brazil. xxix, 123.
Saccharin, Peligot. xxviii, 299.
Saccharine substances in the living plant appear to be in a state of continual change, Commaille. xix, 256.
Saccharo-chirettin, Kemp. xix, 158.
Saccharomyces APICULATUS, Hansen. xxx, 454.
Saccharose, see **SUGAR, CANE**.
Saccharum SPICATUM, China. xxiv, 756; xxviii, 105.
Sachet powders, Saunders. xxvi, 769.
Sachets: **BOUQUET**, Miller. xxiii, 117;—**CLOVE-PINK**;—**FRANGIPANNI**, Saunders. xxvi, 770;—**HELIOTROPE**, Avery. xxvii, 124; Saunders. xxvi, 770;—**JOCKEY CLUB**, Saunders. xxvi, 771;—**MILLEFLEURS**, Cotzhausen. xxv, 322; Saunders. xxvi, 771;—**MUSK**, Avery. xxvii, 124;—**NEW-MOWN HAY**, Miller. xxiii, 117;—**VERBENA**, Avery. xxvii, 124;—**WILD FLOWERS**, Saunders. xxvi, 771.
Safed d'hatura, India=**Datura alba** and **D. fastuosa**. xxviii, 123.
Safflower, coloring power, Küpfer. xxvi, 382—seed, India. xxiv, 722.
 — see also **CARTHAMUS**.
 — **CHINESE**=**Hibiscus rosa-chinensis**. xxiv, 747.
Saffron. **AFRICAN**, **carthamus**; **scrophulariaceous** flowers, Maisch. xix, 506.
 — **AMERICAN**, see **SAFFLOWER**.
 — **"HAY,"** Kashmir xxx, 152.
 — **SPANISH, (CROCUS). ADULTERATION**. xviii, 274; xix, 295, 338; xxiii, 136, 510; xxv, 354; shredded betf, Groves. xxiv, 125; flowers of **Lyperia crocea**, Maisch. xxi, 487—detect of adult. xxvii, 144; Hager. xxi, 264; Sieboldt. xxviii, 278—analysis, Stoddart. xxvi, 192—color reaction, Stoddart. xxvi, 191—coloring power, Küpfer. xxiv, 382—**CULTIVATION**: **Abruzzi (Italy)** Groves. xxiv, 124; **France**. xix, 295; xxiii, 136; **Greece**, Landerer. xxvii, 144; **Persia**. xxi, 264; **Spain**. xxix, 129—history, Allen; Holmes. xxix, 129—oil, isomeric with carvol, Weiss. xxvi, 192—therapeutic value, Patze. xxvi, 192—yield. xix, 295; xxiii, 136; xxix, 129.
Safranin, act. of sulph. ac. xxiii, 431—chromatic scale, Böttger. xxii, 282—coloring power, Küpfer. xxiv, 383.
Safrene, (in oil sassafras), Grimaux and Ruothe. xviii, 273; xxv, 272.
Safrol, (sassafras camphor), Arzruni. xxv, 272.
Sagapenum, behavior to reagents, Hirschsohn. xxvi, 453-9.
Sage, virtues two hundred years ago. xxvi, 843, 4—cultivation at Mitcham. xxiii, 151—germinat. of seed, Saunders. xxx, 567.
 — see also **SALVIA**.
 — **FORKING**=**Salvia lanceolata**, Kansas. xxix, 446;—**S. WHITE**=**Audibertia polystachya**, California. xxvii, 163;—**S. WILD**=**Salvia Pitcheri**, Kansas. xxix, 446.
 — **BRUSH**=**Artemisia tridentata**, California. xxvii, 176.
Sagittaria SIMPLEX, Arizona. xxvii, 140;—**S. VARIABILIS**, Kansas. xxix, 439.
Sago, descript., Harrington. xxiv, 310; Reed. xxvi, 510—etymology. xxiii, 359—powdering by hand. xxiii, 598—preparation in Sumatra, Rosenberg. xxvii, 140.
Sah-a-weep=**Sueda diffusa**, California. xxvii, 285.
Sai-hee=**Citrus bigaradia** var. **trifolia**, Japan. xxviii, 169.
Sajji=crude potash, India. xxiv, 715.
 — **MUTTI**=impure carbon. sodium, India. xxiv, 786.
Saji (Sasi)=**OMODAKA**=**Alisura plantago**, Japan. xxviii, 105.
Saké, brewing (rice beer) Japan, Atkinson. xxvii, 402—ferment, Japan. xxvii, 402.
Sakhree=a spec. of celery, India. xxvii, 192.
Sal Dammar, fr. **Shorea robusta**, India. xxiv, 718.

Salai (Salah)=resin fr. *Boswellia serrata*, India. xxiv, 195—resin fr. a species of *Terminalia*, India. xxiv, 718.

Salajit=Native sulphate aluminium, India. xxiv, 786.

Salary of ASSISTANT PHARMACISTS, Rittenhouse. xxii, 355—Balluff. xxii, 359.

Salernitan School. xxii, 479.

Salicaceae. xxii, 162; xxvi, 311; xxvii, 274; of California. xix, 306; Kansas. xxix, 450.

Salicariaceae. xxiii, 209; xxvi, 281; xxvii, 237; xxix, 207.

Salicin, review. Diehl. xxiii, 476—act. of arseniate sod., Tattersal. xxviii, 324, 5; of heat, Schiff. xxix, 350; of bichromate mixt. and chlorin. lime, Hamlin, Jr. xxix, 325; of sulphomolybd. ammon., Buckingham. xxi, 369; of sulph. ac. and sugar, Hamlin, Jr. xxix, 325—of chloride zinc, Jorisson. xxix, 267—microsublimating point, Blyth. xxvii, 483—as substit. for salicylic ac., MacLagan and Senator. xxiv, 369—solubility, Parker. xxx, 443.

—ARTIFICIAL, fr. helicin, Michael. xxviii, 344.

Salicyl-hydruret=salicylous ac. xxiii, 746.

Salicylic hydride. See ALDEHYD, SALICYLIC.

Salicyl-tropein, Ladenburg. xxviii, 321: xxix, 337; xxx, 424.

Salicylates, physiolog. effects, James. xxix, 314—as effective as the acid therapeutically, but of no use as preservative, Squibb. xxv, 550.

—ACID, Hoffmann. xxvi, 540.

Salicylol=salicylous acid. xxiii, 746.

Saligenin. xxiii, 746.

Saline solutions, freezing is in no relation to crystallizability or solubility of the salt, Wittstein. xix, 137.

Salisburia ADIANTIFOLIA, China. xxiv, 744.

Saliva. act. of iodic ac. and starch, sulphomolybd. ac., ferric chlor., Brown. xxvii, 485, 6.

Salivary glands, glycerin extract, Poster. xix, 234.

Salix ALBA. xxvii, 275;—S. BRACHYSTACHYS, California. xix, 306;—S. CAPSEA, India, descript., Dymock. xxviii, 198;—S. NIGRA, Kansas. xxix, 450;—S. FRAGILIS ALBA, var. FRAGILIOR;—S. FRAGILIS, var. VITELLINA;—S. VIRIDIS, var. FRAGILIS ALBA. xxvii, 275.

Salmalia MALABARICA, India, descript., Dymock. xxv, 233.

Salsa paisana=*Smilax aspera*, Malta. xxvi, 167.

Salse perilla, DOMESTICK and WILD, 1610. xix, 492.

Salt, California. xxvii, 637.

—see also SODIUM CHLORIDE.

Salts, keep in dry form for dispensing purposes, Fairthorne. xxix, 65—applied endermatically. xxx, 623.

—, hitherto IMPOSSIBLE, may be formed by using anhydrous ether, Skey. xxvi, 478.

—CARLSBAD, comp. Harnack; Ragsby. xxviii, 235—ARTIFICIAL, Almén; Bruunengraber; Schlickum. xxviii, 235.

—rock-, analysis, Sloan. xxix, 256.

Saltgrass, common, = *Bryzophorum spicatum*, California. xxvi, 737.

Saltpetre, supply in Bolivia. xxi, 150—Chili. xxvii, 299—India. xxiv, 786.

—see also POTASSIUM NITRATE.

Salvia, see also SAGE.

—species yielding CHIA seed, Maisch. xxx, 173.

—BLANCA, Arg. Republ. xxiv, 762;—S. CARDUACEA, California. xix, 314;—S. CHIAN, Mexico. xxx, 172, 4;—S. COLUMBARIA, California, Arizona, etc., xix, 304; xxvii, 163; xxx, 173;—S. DISCO;—S. ESCLAREA, Arg. Republ. xxiv, 763, 4;—S. HISPANICA, Mexico. xxx, 172;—S. HOMINUM. xxx, 173;—S. LANCEOLATA, Kansas. xxix, 446;—S. LAURA;—S. MATICO;—S. MORADA, Arg. Republ. xxiv, 763;—S. MULTIRHIZA, China. xxiv, 747;—S. PATENS, Mexico. xxx, 174;—S. PITCHERI, Kansas. xxix, 446;—S. PLEBIA, China. xxiv, 748;—S. POLYSTACHYA, xxx, 174;—S. POMIFERA, Greece. xxiv, 134; xxix, 141;—S. PUNA, Arg. Republ. xxiv, 763;—S. REAL DE MEXICO=*Buddleia globosa*. xxiv, 772;—S. REAL DE PUEBLA=*Lippia callicarpæfolia*, Mexico. xxiv, 772;—SCLAREA, uses in

Salvia. (Continued.)

Turkestan. xxi, 220;—S. SILVESTRE, Arg. Republ. xxiv, 761;—S. URTICIFOLIA;—S. URTICILLATA;—S. VERBENACEA;—S. VIRIDIS. xxx, 173.

Salviol, Muir. xxvi, 446.

Samadera INDICA, India. xxiv, 165.

Samaraskite, spectrum, Boisbaudran. xxvii, 345.

Samarium, Boisbaudran. xxviii, 256; Soret. xxix, 262.

Sambhaloo-ka-bij = a spec. of *Vitex*, India. xxviii, 126.

Sambucus CANADENSIS, constituents of fruit, Metzger. xxx, 207—of bark, Traub. xxx, 207—in Japan. xxviii, 158—Kansas. xxix, 441.

—GLAUCA, California. xix, 302; xxvii, 192;—S. MEXICANA. xxiv, 775.

—NIGRA, analysis of ash of bark, Huber. xxiv, 153—in Japan, descript., Holmes. xxviii, 158—preparations (juice of leaves; wine of bark), Govaerts. xxix, 166—use of leaves in Malta. xxvi, 167.

—PUBENS, California. xix, 302;—RACEMOSA, California. xxvii, 192.

Samudra Shok = *Argyrea speciosa*, India. xxv, 145.

Samundar Phal=*Barringtonia acutangula*, India. xxv, 204.

San-che=*Gardenia florida*, China. xxviii, 157.

San-Dajoka = *Alpinia japonica*, Japan. xxviii, 115.

San Francisco, drug market. xxvii, 562—export and import. xxiv, 401, 2—pharmacy law. xxiv, 430, 2.

Sand-blast apparatus. xxix, 54.

Sandarac, behav. to reagents, Hirschsohn. xxvi, 453—9—solubilities, Sacc. xix, 310—in eucalyptus oil, Osborne. xxvii, 234—sp. gr., Hager. xxvii, 424.

Sander, Enno. Annual address. xx, 38—inaugural address. xix, 53—creasote. xx, 66, 244.

—discussions. xix, 53, 60, 61, 66, 68, 69, 71, 75, 76, 77, 93, 94, 95, 100, 105, 109, 114, 117, 118, 120, 121, 123, 126; xx, 25, 26, 28, 29, 30, 44, 66, 67, 99, 102.

Sang-pwan-hea = *Pinellia tuberifera*, China. xxviii, 102.

Sang-shih-see=*Gardenia florida*, Japan. xxviii, 157.

Sang-yak=*Dioscorea japonica*, Japan. xxviii, 111.

Sanguinaria, substit. by whole turmeric (!), Crawley. xxiii, 51c—adult. of powd. xxx, 576—constituents, Carpenter. xxvii, 223; Hopp. xxlii, 203; Pierpoint. xxi, 243—microscop. and chemical character, Slocum. xxix, 201—resin, Slocum. xxix, 203—plant requires shade. xxviii, 503—root not attacked by *Tinea zea*, Saunders. xxi, 627—eighty years ago. xxvi, 849.

Sanguinaria, Arg. Republ. xxiv, 762;—S. BLANCA and S. COLORADA, Arg. Republ. xxiv, 764;—= *Polygonum virgatum*, Chili. xxiv, 765.

Sanguinarina (ALKALOID), in *Macleya cordata*, Eyckmann xxx, 233—history. xxi, 376—constitution, Nashold. xviii, 267.

—(ECLECTIC) examin., Little. xxv, 97—solubility, Parker. xxx, 128.

Sanguis bovinus exsiccatus, therapeut. value, Le Bon. xxx, 81.

Sanicle, WHITE=*Eupatorium ageratoides*, Kansas. xxix, 442.

Sanicula CANADENSIS;—S. MARYLANDICA, Kansas. xxix, 452;—S. MENZIESII, California. xix, 301.

Sanipat, India, descript., Dymock. xxviii, 120.

"Sanitas" (peroxide hydrogen and oxidized turpentine), Kingzett. xxvi, 627.

Sansisi = *Gardenia florida*, Japan. xxviii, 157.

Santa Maria nuts = fr. *Calophyllum calaba*, Jamaica. xxiv, 732.

Santal, cryst. subst. fr. red saunders, Weidel. xviii, 284.

Santalaceae. xxvii, 146; xxx, 153; of Kansas. xxix, 451.

Santalin, fr. red saunders, Weidel. xviii, 284.

Santiria, Blume, India. xxiv, 196.

Santonica, table of proper doses, Hager. xxiii, 215—yield of oil, Osse. xxiv, 276—estimat. of value, Dragendorff. xxvi, 229.

- Santonin**, adult. (mica) xix, 346; (picric ac.), Harrison. xxiii, 519; (boric ac.). xxii, 458; xxviii, 347; (61 p. c.), Stevenson. xxvii, 530—act. of sulphomolybd ammon., Buckingham. xxi, 369; of chloride zinc, Jorisson. xxix, 267—cause of diff. crystallizat., Eberbach. xxiv, 544, 683—purity of commercial, Hoffmann. xxii, 456—deleterious on remaining in the system, Boddy. xxvi, 613—fusing point, Leroy. xxvi, 613—isolated by coal oil, Boiraux and Léger. xxiii, 449—cont. santonin acid, Cannizaro and Sestini. xxii, 280—solution, Harland. xix, 164—spectrum, Meyer. xxvii, 479, 482—test, Lindo. xxvi, 613.
- Sanvitalia procumbens**, Mexico. xxiv, 774.
- Sao hime** = *Rehmannia lutea*, Japan. xxviii, 205.
- Sapin ARGENTÉ** = *Abies pectinata*, D. C. x. vi, 313; — *S. BAUMIER DE GILÉAD* = *Abies balsamea*, D. C. xxvi, 315; — *S. BLANC* = *Abies pectinata*, D. C. xxvi, 313; — *S. FAUX* = *Abies excelsa*, D. C. xxvi, 323; — *S. À FEUILLE D'IF* = *Abies p. ctinata*, D. C. xxvi, 313; — *S. GENTIL*; — *S. DU NORD* = *Abies excelsa*, xxvi, 323; — *S. DE NORMANDIE* = *Abies pectinata*, D. C. xxvi, 313; — *S. DU NORVÈGE* = *Abies excelsa*, D. C. xxvi, 323; — *S. PECTINÉ*; — *S. EN PERGNE* = *Abies pectinata*, xxvi, 313; — *S. PRESSE*; — *S. ROUGE* = *Abies excelsa*, D. C. xxvi, 323; — *S. DES VOSGES* = *Abies pectinata*, D. C. xxvi, 313.
- Sapindaceæ**. xix, 267; xxi, 239; xxv, 189; xxvi, 269; xxx, 223; of California. xix, 300; Kansas. xxix, 451.
- Sapindus DIVARICATUS**, Brazil. xxiii, 121; — *S. MARGINATUS*, Kansas. xxix, 451; — *S. TRIFOLIATUS*, India, Dymock. xxvi, 166.
- Sapista (stan)** = *Cordia myxa* and *C. latifolia*, Turkestan. xxi, 221—India. xxviii, 129.
- Sapo**, see also SAVON; SOAP.
- *DESINFICIENS PHENYLATUS*. xviii, 209.
- *GUAIACINUS*, Dutch Pharm. Soc. xxx, 106.
- *MOLLIS*, see SAPO VIRIDIS.
- *NIGER*, see SAPO VIRIDIS.
- *PICIS LIQUIDÆ*, Dutch Phar. Soc. xxx, 107.
- *STIBIATUS*, Dutch Phar. Soc. xxx, 107.
- *TEREBINTHINÆ LIQUIDUS*, Dutch Phar. Soc. xxx, 107.
- *VIRIDIS*, adult., Osler. xxi, 503—Betz. xxvi, 144; Lehlbach. xxi, 604, 6; xxii, 83; Shuttleworth. xxvi, 145—preparations. xxi, 181.
- Sapodilla**, fruit cont. milk sugar. xxx, 369.
- Saponacea** = *Sapindus divaricatus*, Brazil. xxiii, 121.
- Saponaria OFFICINALIS**, Kansas. xxix, 441.
- Saponin**, behav. to reagents, Köhler. xxii, 278—chemical history, Christophsohn. xxiii, 447—microsublimat. point, Blyth. xxvii, 483—in root bark of *Chionanthus virginica*, Justice. xxiii, 150.
- Saponit**, Greece. xxiii, 283.
- Saponochoa** = *Saponit*, Greece. xxiii, 283.
- Sapota ACHRAS**, Mexico. xxiv, 774; — *S. MUELLERI*, Guiana. xviii, 272; Honduras. xxx, 187.
- Sapotaceæ**. xix, 286; xxii, 112; xxv, 152; xxvi, 219; xxvii, 172; xxix, 154; xxx, 185; of Mexico. xxiv, 774.
- Sappan** = *Caesalpinia sappan*, India. xxiv, 716.
- *WOOD*, Jamaica. xxiv, 736.
- Sappanin**, Schröder. xxi, 390.
- Sapsun** = *Aristolochia indica*, India. xxv, 130.
- Saral** = wood of *Pinus longifolia*, India. xxviii, 198.
- Saratoga**, geology, Fish. xxviii, 486—mineral springs, Fish. xxviii, 486; history. xxviii, 489.
- Sarcocolla** fr. spec. of *Astragalus*, India, descript., Dymock. xxvii, 248.
- Sarcosina**, decomposit. product of caffeidina, Rosengarten. xix, 231.
- Sargent, E. H.** Annual address. xviii, 27—fluid extracts. xviii, 102—liq. magnes. citr. xix, 530—revision of the pharmacopœia. xxiv, 644.
- discussions. xviii, 17, 44, 45, 46, 47, 102, 103, 104, 109, 112, 113; xix, 30, 31, 64, 65, 67, 68, 70, 74, 76, 92, 94, 98, 100, 101, 102, 104, 105, 106, 107, 108, 114, 120, 123, 126; xxii, 498, 504, 507, 572; xxiv, 644, 645, 646, 649, 656, 657, 660, 661, 666; xxvii, 800, 801, 802.
- Sari-kasondi** = *Cassia sophora*, India. xxvi, 166.
- Sarothamnus SCOPARIUS**, cont. spartein, Merck. xxvii, 520. See also SCOPARIUS.
- Sarpankha** = *Tephrosia purpurea*, India. xxvi, 162.
- Sarracenia PURPUREA**, California. xxvii, 611. See also PITCHER PLANT.
- Sarragota SEED** = *Psyllium*. xxx, 161.
- Sarsaparilla**, adult. of powd. xxx, 576—contamin. (fleas) xix, 338; (nut galls, matico, digitalis, etc.) Brown. xxiv, 407—comparative examin., Marquis. xxiii, 131—influence of heat on preparations, Judge. xxi, 595—menstruum, Squibb. xxi, 95—A. D. 1610. xix, 492.
- collection on the AMAZON, Smith. xxix, 122—is the best, Squibb. xxi, 95—JAMAICA. xxiv, 734—MEXICAN, superior to Honduras, Radius. xxviii, 107.
- BLACK, Arg. Republ. xxiv, 764.
- Sasa** = *Eulalia Japonica*, Japan. xxviii, 104.
- *rindo* = *Gentiana Buergeri*, Japan. xxviii, 134.
- Sasadritz** = *Eulalia japonica*, Japan. xxviii, 104.
- Sashime** = *Rehmannia lutea*, Japan. xxviii, 205.
- Sassafras**, act. of sulph. ac. and alcohol, Doliber. xix, 444—adult. of powder. xxx, 576—antagonistic to hyoscyamus and tobacco, Lyle. xxv, 131—drug market. xx, 110; xxi, 435, 450; xxii, 643; xxvi, 647—A. D. 1610 xix, 491—in Kansas. xxix, 446.
- CAMPHOR (of St. Evre) identical with saffrol, (of Grimaux and Ruotte) Arzruni. xxv, 273.
- tree = *Atherosperma moschata*, Australia. xxi, 262.
- Sassy bark** = *Erythrophloeum guineense*, Liberia. xxvi, 169, 661—xxv, 217.
- Satawree** = *Asparagus racemosus*, India. xxv, 125.
- Sato momu** = *Amygdalus persica*, Japan. xxviii, 179.
- Saturations**, Diehl. xxvii, 733—Attfield (table). xix, 140.
- Satureja JULIANA**, analysis, Spica. xxviii, 127; — *S. MONTANA*, oil. xxx, 323.
- Satween BARK** = *Alstonia scholaris*, India. xxiv, 724; xxv, 153.
- Saucecillo**, Arg. Republ. xxiv, 762.
- Sauco**, Arg. Republ. xxiv, 763; — *Sambucus Mexicana*, Mexico. xxiv, 775.
- Saunders, RED**, coloring power, Küpfer. xxiv, 383—crystalline subst., Weidel. xviii, 284.
- Saunders, W.** Annual address. xxvi, 841—inaugural address. xxi, 56; xxv, 503—Canada, medicinal plants. xviii, 107, 182; pharmacy. xix, 429—cantharides. xxiv, 505—cinnamon water. xxiv, 686—cologne. xxv, 418—cream of tartar in Ontario. xxv, 458—decoct. and infusions fr. fluid extracts. xxvii, 710—home-made solid extracts. xviii, 107; xix, 468—extr. *Cannabis indica*. xx, 220—germination of seed. xxx, 565, 648—keeping herbs. xix, 121—India rubber fr. milkweed. xxiii, 655—insects, enemies of drugs. xxi, 624—Mexican honey ant. xxi, 648—microscopes. xxiv, 680—perfumery. xxiv, 496—report drug market. xxv, 335—sachet powders. xxvii, 769—senega. xxiv, 661.
- discussions. xviii, 107; xix, 62, 91, 111, 121, 122; xx, 76, 88, 98; xxi, 56, 59, 88, 89; xxii, 500, 501, 504, 505, 537, 538, 539, 540, 541, 554, 559; xxiii, 788, 797, 808, 818, 822, 823, 831, 833, 834, 839, 843; xxiv, 572, 595, 596, 612, 613, 658, 661, 662, 668, 671, 675, 680, 682, 683, 686, 692; xxv, 503, 507, 508, 514, 515, 516, 520, 521, 530, 540, 541, 546, 547, 556, 557, 558, 570, 577; xxvi, 841, 872, 881, 893, 895, 898, 904, 905, 906, 908, 909, 910, 915; xxviii, 569, 570, 573, 574; xxix, 511, 516, 523; xxx, 624, 638, 647, 648, 656, 662, 663, 664, 665.
- Saururaceæ**. xxviii, 103; of California. xix, 306.
- Savin**, adult. of powd. xxx, 577.
- Savon ANTISYPHILITIQUE**, Ebert. xxiii, 91.
- Sawdust**, yields alcohol, Zetterlund. xxii, 225.
- Saw Palmetto** = *Sabal serrulata*. xxvii, 139.
- Saxifraga CORDIFOLIA**; — *S. CRASSIFOLIA*, cont. bergenin. xxx, 444; — *S. PELTATA*, California. xix, 301; — *S. SIBIRICA* cont. bergenin. xxx, 444.
- Saxifragaceæ**. xxviii, 174; xxix, 205; xxx, 235; of California. xix, 301.
- Scaled Preparations** (electricized nickel plates, or a very thin film of wax). xxx, 53.

- Scales**, pans of HARD RUBBER become easily electric, Christel xxvi, 44.
 —, METRIC, Fairbanks. xxv, 569.
 — see also BALANCES.
- Scammony**, adult. (starch), Prunier. xxiv, 135; Govaeriz. xxvi, 211; xxvii, 166; (flour). xxii, 311; mineral adult. detect. by chlorot. xxviii, 278—Haselden has never found any adult. xxii, 311; xxiii, 153—Greenish finds the lump scammony pure. xxiii, 511—the active principle is an anhydride, Buchman. xxii, 109—constituents, Hager. xxii, 109; Heiss. xxiii, 153—COMMERCIAL VARIETIES (Angora, Skeleep, Syrian, Virgin), Greenish. xxiii, 152.
 — BAZAR (Bombay). is all fictitious, Dymock. xxv, 144.
 — RESIN, adult. (guaiac resin). xxii, 311—behav. to reagents, Knijse. xxvi, 153—alcohol. extract might be substituted, Markoe. xxv, 406—from root cont. tannin, fr. commercial scammony not, Heiss. xxiii, 153—prepared in Smyrna (91 p. c. resin). xix, 288—p. c. of resin, Wrenn. xxx, 174—prep., Markoe. xxiv, 691; Perrot. xxvi, 135—prop., Köhler and Zwicke. xviii, 277 test for purity (oil turpentine not reliable), Knijse. xxiii, 153.
- Scammony plant**, flowering in Paris (France). xxii, 108.
- Scandia**, Wilson. xxvii, 345; xxix, 261; Clève. xxviii, 257.
- Schafer, G. H.** Annual address. xxix, 479—elix. podophyll. co. xx, 224—liquor dealer's license. xxii, 545, 7; xxix, 481—shop furniture. xxi, 583.
 — discussion. xix, 118, 127; xxii, 545, 547, 549, 550; xxviii, 514, 562; xxix, 479.
- Scheele's MERRIT**. xxii, 530.
- Scheffer, E.** Statistics of manufacture. xxiv, 534—lactopeptin. xxiv, 546—pancreatin. xxiii, 725; diastase, ptyalin. xxiv, 551—pepsin, act. of alkal. solut. xx, 81.
 — discussion. xx, 81; xxiv, 672; xxvi, 896, 900, 902.
- Schering's exhibit**, Centennial. xxiv, 792.
- Scherzer, C.** Opium culture. xxii, 628.
- Schinus MOLLE**, Mexico. xxiv, 777.
- Schioicao** = Chinese waterproof paint. xix, 171.
- Schiresch** = *Asphodelus ramosus*, Turkestan. xxi, 209.
- Schizandra CHINENSIS**, Japan. xxviii, 167; —S. NIGRA, Japan, descript., Holmes. xxviii, 166.
- Schizomycetes**. xxx, 146.
- Schkuhria ABROTANOIDES**, Mexico. xxiv, 777.
- Schleichera TRIJUGA**, India. xxviii, 195.
- Schlippe's salt** cont. hyposulphite sod., Ludwig. xix, 217—Dutch Phar. Soc. xxx, 107.
- Schrankia UNCINATA**, Kansas. xxix, 447.
- Schuchardt**, exhibit, Centennial. xxiv, 792.
- Schumann, Th.** xxvi, 915.
- Schweitzer's SOLVENT** for CELLULOSE, Böttger. xxiii, 298.
- Schwell-copal**, Schwartz. xxvii, 208.
- Schwindelbeeren** = *Viburnum lantanum*. xxvi, 243.
- Sciaena LUCIDA** yields Chinese isinglass. xxii, 172.
- Scilla**, see also SQUILL.
 — MARITIMA, uses in Malta. xxvi, 168; —S. TRAVERI, Kansas. xxix, 447.
- Scillain**, Jarmersted. xxviii, 348.
- Scillin**, Husemann. xxviii, 108, 9—of Riche and Rémont. xxix, 123; identical with sinistrin (of Schmiedberg) Power. xxix, 124.
- Scillipicrin**, Husemann. xxviii, 108, 9.
- Scillitin** cont. 3 distinct principles, Merck. xxviii, 108.
- Scillitoxin**, Husemann. xxviii, 108, 9.
- Scirpus LACUSTRIS**, Kansas. xxix, 444.
- Sclererythrin**, Dragendorff and Podwissotsky. xxiv, 119—Tanret. xxv, 118.
- Sclerocrystallin**, Dragendorff and Podwissotsky. xxiv, 119.
- Scleriodin**, Dragendorff and Podwissotsky. xxiv, 119—color react. with sulph. ac. xxv, 119.
- Scleromucin**, Dragendorff and Podwissotsky. xxiv, 119.
- Scleroxanthin**, Dragendorff and Podwissotsky. xxiv, 119.
- Scofield, Jas. S.** xxiv, 669.
- Scoparius**, germinat. of seed, Saunders. xxx, 567.
 See also SAROTHAMNUS SCOPARIUS.
- Scoparia DULCIS**, Liberia, descript., Holmes. xxvi, 169.
- Scoparin**, prop. and therapeut. value, Merck. xxvii, 529.
- Scopolia CARNIOLA**. xxviii, 121; —S. JAPONICA, Japan, uses, Martin. xxvii, 159; descript., Holmes. xxviii, 121.
- Scorodones**=Garlic bed, Greece. xxvii, 141.
- Scrinto**=*Abies excelsa*, D. C., France. xxvi, 323.
- Scrophularia root**, loss in drying. xxi, 283.
- Scrophulariaceae**. xviii, 276; xix, 290; xxi, 214; xxii, 105; xxiii, 148; xxiv, 132; xxv, 134; xxvii, 157; xxviii, 119; xxix, 136; of California. xix, 304; Kansas. xxix, 451; Mexico. xxiv, 772.
- Scutellaria BOLANDERI**, California. xix, 304.
 — LATERIFOLIA, Kansas. xxix, 446; —S. TUBEROSA, California. xix, 304.
- Scurvy**, juice of *Agave Americana*. xxiii, 134.
- Seabury, Geo. F.** Banquets. xxx, 661, 3—committee of entertainment. xxx, 644.
 — discussion. xxix, 528; xxx, 644, 645, 661, 663.
- Seasickness**, (chloral) Giralde. xxiii, 81—(chlorof.) Landerer. xxiii, 77.
- Seaweeds**, coloring matter, Descourt. xxviii, 354.
 See also ALGÆ.
- Sebastens**—fruit of *Cordia myxa* and *latifolia*, India. xxviii, 129.
- Sebipira** (Sebupira)=*Bowditchia major*, Brazil. xxv, 232.
- Sebuka**=*Sambucus nigra*, Malta. xxvi, 167.
- Secretaries**, CORRESPONDING. xviii, 7; xix, 9; xx, 9; xxi, 9; xxii, 9; xxiii, 9; xxiv, 10; xxv, 9; xxvi, 9; xxvii, 9; xxviii, 9; xxix, 11; xxx, 9.
 — LOCAL, to be appointed by president and permanent secretary. xxiv, 594—xviii, 7; xix, 9; xx, 9; xxi, 10; xxii, 10; xxiii, 10; xxiv, 10; xxv, 9; xxvi, 9; xxvii, 9; xxviii, 9; xxix, 11; xxx, 9.
 — PERMANENT, see also MAISCH, J. M.—opens 19th meeting. xix, 25—salary increased, Squibb. xxi, 95.
 — RECORDING. xviii, 7; xix, 9; xx, 9; xxi, 9; xxii, 9; xxiii, 9; xxiv, 9; xxv, 8; xxvi, 8; xxvii, 9; xxviii, 8; xxix, 11; xxx, 9.
- Section "Q,"** Markoe. xxx, 663.
- Sedum ACRE**, analysis, Mylius. xxi, 244.
- See-yoh-bei**=*Geum japonicum*, Japan. xxviii, 180.
- Seeds**, freshness determined, Bernbeck. xxx, 142
 —when to gather. xviii, 140—germinat., Saunders. xxx, 565—germination, vivifying effects of camphor and oil turpentine. xxii, 168.
 — "COLD," of Bombay, Dymock. xxvii, 229—of former times in Europe, Guibourt. xxvii, 229—of Frch codex, Guibourt. xxvii, 229.
- Seed box**=*Ludwigia alternifolia*, Kansas. xxix, 448.
- Sehund**=*Euphorbia nervifolia*, India. xxviii, 192.
- Seidlitz powder**, see POWDER, SEIDLITZ.
- Seki-sho-kung**=*Acorus gramineus*, Japan. xxviii, 102.
- Sekkee-doo-hee** = *Punica granatum*, Japan. xxviii, 176.
- Sel Boergrave**. xxi, 503.
- Selaginella MARTENSII**, cont. alumina, Church. xxii, 126; —S. SPINULOSA, p. c. of ashes, Church. xxiii, 126.
- Seleno-cyanides**, see respective metals.
- Selenium**. xxii, 177; xxiii, 243; xxvi, 351; xxvii, 304; xxx, 268—act. of ozone, Mailfert. xxx, 259—atomic weight, Patterson and Eckmann. xxvi, 351—fr. deposit of sulph. ac. chambers. xxiii, 243—in Arg. Republ. xxx, 268—in sulphur of Japan, Divers. xxx, 268.
- Self heal**=*Brunella vulgaris*, Kansas. xxix, 446.
- Seltzer Aperient**, TARRANT, analysis, Schrage. xxiii, 88.
- Selu** = fruit of *Cordia myxa* and *C. latifolia*, India. xxviii, 129.
- Semecarpus ANACARDIUM**, India, descript., Dymock. xxvi, 167—use of fruit in Turkestan. xxi, 258. See also ANACARDIUM.

- Sen** — *Cassia venicosa*, Chili. xxiv, 766; — *S. SILVESTRE*, Arg. Republ. xxiv, 763.
- Sen-buri** — *Pleurogyne rotata*, Japan. xxviii, 135.
- Sen-rio** — *Foeniculum vulgare*, Japan. xxviii, 159.
- Sen-uzu** — *Aconitum chinense*, Japan. xxix, 173, 175, 182.
- Senebiera INCISA**; — *S. PINNATIFOLIA*, Brazil. xxvii, 152.
- Senecio AUREUS, Kansas. xxix, 442; — *S. BOLANDERI*, California. xix, 303; — *S. CANICIDA*, Mexico. xxiv, 775; — *S. CYNOSUS*, Chili. xxiv, 765; — *S. DOUGLASSII*, California. xix, 303.**
- Senega**, Wells. xxiv, 516—active principle in the rootbark, Schneider. xxiv, 176—rootlets more active than the root, Greenish. xxvii, 215—adult. of powd. xxx, 577—adult. (root of *Asclepias vincetoxicum*), Patrouillard. xxiii, 511; xxiv, 178; Holmes. xxvii, 216—of commerce. xxiv, 661; Lloyd. xxix, 453, 521—descript., Holmes. xxvii, 216—drug market. xix, 397; xx, 127; xxi, 440, 450; xxii, 641, 3; xxv, 336; xxvi, 647—germinat. of seed, Saunders. xxx, 567—microscop. structure, Grebel. xxx, 224; Greenish. xxvii, 214—mixed with cypripedium. xix, 338—is not attacked by *Tinea zeæ*, Saunders xxi, 627—eighty years ago. xxvi, 849—in Indiana. xxviii, 502; Ohio. xxviii, 503; Wisconsin. xxix, 455.
- "FALSE" or "NORTHERN." xxix, 454, 456, 522; — *Polygala Boykinii*, Maisch. xxx, 226 — "SOUTHERN," Lloyd. xxix, 453; microscop. struct., Gœbel. xxx, 224; — "WHITE," Maisch. xxv, 525; xxix, 456.
- Senegin**, identical with saponin, Christophson. xxiii, 448.
- (ECLECTIC) solubilities, Parker. xxx, 128.
- Seng-kiu** — *Conioselinum univittatum*, Japan. xxviii, 159.
- Seng-kootz** — *Nuphar japonica*, Japan. xxviii, 115.
- Senna**, active principles, Bourgoin and Bouchut. xix, 272—adult. of powd. xxx, 577 drug market. xx, 124, xxiv, 397; xxx, 471—extracted by alcohol, activity, Siebold. xxiv, 189; is more pleasant, Diehl. xxiv, 190; extr. with potassa, Wells. xxiii, 74—microscop. struct., Lenz. xxx, 238—act. upon urine, Gubler. xxii, 152—needs garbling. xix, 338.
- *ALEXANDRIA*, microscop. struct., Lenz. xxx, 238.
- *PRAIRIE*—*Cassia chamæcrista*, Kansas. xxix, 447.
- *TINNEVELLY*, a most active purgative, when odor, color and taste have been previously removed by alcohol, Buchheim. xxii, 152—microscop. structure, Lenz. xxx, 241.
- "SMALL"—*Cassia occidentalis*, Liberia. xxvi, 169.
- *SPURIOUS* fr. *Cassia breviceps*, *chamæcrista*; Panama, Holmes. xxiii, 210, 511.
- *JAMAICA*, fr. *Cassia obovata*. xxiv, 734.
- Sennapicrin**, isomeric with jalapin and jalapinic acid, Ludwig and Steitz. xviii, 285.
- Sente**, Java. xxiv, 742.
- Septicin**, see also PTOMAINES—first discovered by Marquardt (1865). xxiii, 434—named animal chinoidin by Dupré. xxiii, 435—prop., Gelder. xxvii, 522; Oldekop and Lieventhal. xxiii, 436; Schwanert. xxiii, 435.
- Sequoia GIGANTEA**, California. xxvii, 604—cont. sequoiene (hydrocarbon), Lunge and Steinkauler. xxix, 237, — *S. SEMPERVIRENS*, California. xxvii, 603.
- Sequoiene**, fr. *Sequoia gigantea*, Lunge and Steinkauler. xxix, 237.
- Serape**—galipot. fr. *Pinus australis* and *P. taeda*. xxvi, 324.
- Serente**—*Abies excelsa*, D. C., France. xxvi, 323.
- Sericographis MOHINTLI**, Mexico. 773.
- Sernamby**—"negro-head" rubber, Brazil. xxvii, 271.
- Serpentaria**, admixt. of cypripedium, Maisch. xxii, 311; hydrastis, Milleman. xxiii, 511—impurities (charcoal, rice husk, glue . . .), Brown. xxiv, 407—drug market. xix, 396; xx, 127; xxi, 450; xxii, 643; xxvi, 647.
- Serratula TINCTORIA**. xxviii, 148.
- Serronia JABORANDI**, Peckolt. xxiv, 160.
- Serum (BLOOD)** as anthelmintic. xxv, 323.
- *SANGUINIS EXSICCATUM*, Vacher. xxv, 323.
- Sesamum INDICUM**, analysis of seed, Harloff. xxii, 113—found in Calcutta linseed, Holmes, xxx, 216—cultivation in India. xxiv, 721—yields gingelly or wanglo oil, India. xxiv, 732.
- *ORIENTAL*, China. xxv, 236—uses in Greece. xxx, 178.
- Setz-kotz-mo-kah** — *Sambucus nigra*, Japan. xxviii, 158.
- Setaria**, seeds in Black Sea linseed, Holmes. xxx, 216.
- Shag bark**—*Carya alba*, Kansas. xxix, 446.
- Shaguma saiko**—*Anemone cernua*, Japan. xxviii, 163.
- Shakayeh (Arabic)**—*Sarcocolla* plant, India. xxvii, 249.
- Shale and PETROLEUM PRODUCTS**, distinct. charact., Allen. xxx, 313.
- Shamareeniyun (Arab-Greek)**—a spec. of celery, India. xxvii, 192.
- Shantung (China)** useful plants. xxv, 234.
- Sharamoto**—*Rheum palmatum*, var. *tanguticum*, Central Asia. xxvi, 197.
- Sharp, A. P.**, hypodermic solut. of quinia. xxi, 96; xxii, 377—phosphoretted oil. xxiv, 624, 6.
- discussion. xxiv, 624, 626, 628, 662, 665, 666.
- Sharples, S. P.**, on adulterations. xxiv, 653—colors for candies. xxvi, 796—distinct charact. of cinchona alkaloids. xxvi, 826—letter about cinchquinine. xxii, 646—graduated measures. xxiv, 459—membership. xxiii, 753, 6, 8—metrical weights and measures. xxiv, 607—microscopes. xxiv, 680—milk, detect. of adult. xxiv, 554—parts by weight. xxiv, 453.
- discussion. xxiii, 822, 823; xxiv, 607, 628, 653, 661, 678, 679, 680, 681.
- Shan-chi-taze**—*Gardenia florida*, China. xxviii, 157.
- Shau-boo-kung**—*Acorus spurius*, Japan. xxviii, 103.
- She**—seeds, Japanese. xxviii, 99.
- Shea butter**, fr. *Bassia butyracea* and *B. Parkii*. xxix, 116.
- Shesua**—*Moringa pterygosperma*, India. xxv, 210.
- Shekar tighal** — insect manna, Persia. xix, 284.
- Shellac**, account, Ball. xxviii, 195—behav. to reagents, Hirschsohn. xxvi, 453—9—bleaching, Eder. xxvi, 310—detect. of rosin, Hager. xxv, 230—drug market. xxi, 437; xxii, 626; xxv, 349; xxvi, 656; xxvii, 560, 7; xxx, 472—solubilities. Sacc. xix, 310; in eucalyptus oil, Osborne. xxvii, 234—sp. gr., Hager. xxvii, 424.
- *VARNISH*, clarified, Peltz. xxiii, 226.
- *ARIZONA* (*Larrea Mexicana*; *Acacia Gregii*), Stillman. xxix, 211.
- *MEXICO*, cont. sarkosinic acid, Herz. xxiv, 203.
- *SONORA*. xxiv, 203—behav. to reagents, Hirschsohn. xxvi, 453—9.
- Shellbark**—*Carya sulcata*, Kansas. xxix, 446.
- Shemmulli**—*Barleria prionitis*, India. xxviii, 124.
- Shen-kottai**—fruit of *Semecarpus anacardium*, India. xxvi, 167.
- Shepherdia ARGENTEA**, Utah. xxvii, 146.
- Shepherd's purse**—*Capsella bursa pastoris*, Kansas. xxix, 443.
- Sheppard, S. A. D.**, Cerat. resin. co. xxvi, 768—medicated waters. xix, 442.
- discussion. xxiii, 833, 835; xxiv, 574, 613, 619, 622, 657, 659, 668, 686, 689; xxv, 518, 528, 531, 535, 536, 538, 555, 569, 571; xxx, 596, 615, 619, 631, 636, 645, 646, 651, 665.
- Sheran-kottai**—fruit of *Semecarpus anacardium*, India. xxvi, 167.
- Shia-kou-bou** — *Roxburghia sessilifolia*, Japan. xxviii, 110.
- Shikimi-no-ki**—*Illicium religiosum*, Japan. xxix, 183.
- Shikon** — *Lithospermum erythrorhizon*, Japan. xxvii, 164.
- Shiku-sha**—*Alpinia japonica*, Japan. xxviii, 115.
- Shimptee**—gum of *Odina Woodier*, India. xxv, 220.
- Shin-ee**—*Magnolia yulan*, Japan. xxviii, 165.

- Shinn, James T.*, Inaugural address. xxviii, 513—letter about inability to attend. xxix, 478—elixirs, substitution. xx, 80—fluid extr. wild cherry. xxvi, 883—liquid preparat. of guaiac. xviii, 78, 148—paraffin paper. xxv, 563.
- discussion. xviii, 52, 63, 79, 107, 109, 110, 111, 112, 113, 114, 116; xx, 37, 44, 52, 56, 80, 83, 85, 95; xxiii, 781, 794, 796, 797; xxiv, 600, 649, 657, 664, 665; xxv, 518, 520, 527, 528, 530, 538, 543, 554, 557, 561, 563, 564, 577; xxvi, 883, 884, 885, 892, 893, 894, 895, 896, 897, 898, 913; xxviii, 513, 531, 532, 533, 534, 536, 539, 540, 550, 560, 565, 570, 572, 573; xxx, 616, 618, 619, 625, 633, 645, 648.
- Shiradai*—*Ipomœa turpethum*, India. xxviii, 130.
- Shirakawa-uzu*—a spec. of aconite, Japan, descript., Langgaard. xxix, 179, 182.
- Shirchist*—*Atraphaxis manna*, Persia. xix, 284.
- Shisso*—*Perilla arguta*, Japan. xxviii, 128.
- Shiuli-p'i*—*Punica granatum*, China. xxviii, 176.
- Sho-bu*—*Acorus spurius*, Japan. xxviii, 103.
- Sho-ee-koh*—*Foeniculum vulgare*, Japan. xxviii, 159.
- Shoemaker, R. M.*, report Philadelphia drug market. xx, 142; xxiv, 393.
- Shomack, A. D.* 1610. xix, 494.
- Shooting star*—*Dodecatheon Meadii*, Kansas. xxix, 449.
- Shop furniture*, labelling, Schafer. xxi, 583.
- Shorah*—crude saltpetre, India. xxiv, 786.
- Shora-kai*—fruit of *Lagenaria vulgaris*, var. *amara*, India. xxvii, 230.
- Shorea ROBUSTA*, India. xxiv, 718;—*S. RUBRIFOLIA*, Cochinchina. xxvi, 256.
- Show color*, purple. xxviii, 40.
- Shu tree*—Japanese oak. xxv, 117.
- Shukai*—a spec. of *Emex*, India. xxviii, 118.
- Shutake*—Japanese mushrooms. xxv, 117.
- Sickle pod*—*Arabis canadensis*, Kansas. xxix, 443.
- Sicopira*—*Bowditchia major*, Brazil. xxv, 232.
- Sicopirinum*, fr. *Bowditchia major*, Peckolt. xxv, 316.
- Sicyos ANGULATUS*, Kansas. xxix, 444.
- Sida ACUTA*;—*S. CORDIFOLIA*, India, descript., Dymock. xxv, 182;—*S. SPINOSA*, Kansas. xxix, 448.
- Sidalcea MALVÆFLORA*, California. xix, 300.
- Sideritis ACHILLEA*;—*S. HIRSUTA*;—*S. THEAZANS*, Greece. xxiv, 133.
- Siderophloid*, Queensland. xxiv, 740.
- Siegesbeckia ORIENTALIS*, Mauritius. xxiv, 741.
- Sieves, DRUM* (parchment paper), Euden. xxi, 152.
- *HAIR*-, mended (gutta-percha in chlorof.), Starting. xxiv, 61.
- with *REMOVABLE* sieve-cloth, Müller. xxvi, 50.
- Signal service of U. S.* xx, 303.
- Signal, CAUTIONARY.* xx, 309.
- *LIGHT*, white. xxvi, 152.
- *STATIONS* at sea. xx, 59.
- Sigre*—*Kumys*. xxi, 200.
- Sika*—*Aralia edulis*, Japan. xxviii, 161.
- Sikimin*, poisonous principle of *Illicium religiosum*, Eykman. xxix, 183.
- Silene GALLICA*, California. xix, 299;—*S. INFLATA*, seeds in Dutch linseed, Holmes. xxx, 215.
- Silica, CRYSTALLIZED*, Marsden. xxx, 281.
- *GELATINOUS*, as a dialyzing membrane, Ullik. xxvii, 315.
- Silicates, NATURAL*, solubility in water, Cossa. xix, 196.
- Silicium.* xix, 196; xxi, 282; xxiii, 257; xxvi, 361; xxvii, 315; xxviii, 229; xxx, 281.
- Silicium compounds* with *CARBON*, Colson and Schützenberger. xxx, 281.
- *HYDRIDE*, solid, Ogier. xxviii, 229.
- , *OXYCHLORIDE*, Troost and Hautefeuille. xxx, 281.
- Silk*, act. of metallic ferricyanides, Bong. xxvi, 369.
- *ANTISEPTIC* (oil juniper), Kocher. xxx, 129.
- cement to *GUTTA PERCHA*. xix, 172.
- Silke grasse, A. D.* 1610. xix, 492.
- Silkworm*, cult. and disease, Pasteur. xix, 313.
- Silphium LACINIATUM*, microscop. struct., Morris. xxx, 192—in Kansas. xxix, 442;—*S. PERFOLIATUM*, Kansas. xxix, 442.
- Silurus PARKERI*;—*S. FELIS*, source of W. I. isin-glass. xxii, 172—in British Guiana. xxiv, 738.
- Silver.* xix, 201; xxi, 316; xxii, 207; xxiii, 310; xxiv, 263; xxv, 266; xxvi, 421; xxvii, 372; xxviii, 254; xxix, 280; xxx, 308.
- act. of nitric ac., Acworth. xxiv, 209; on nitr. ac., Acworth and Armstrong. xxvi, 343; of ozone, Houzeau. xxi, 271—separat. fr. alloys, Solthien. xxx, 308—blackened by sulphur, cleaned. xix, 175—in California. xxvii, 596—freed of copper, Gräger. xxi, 316—detect. of traces in galena, Krutwig. xxx, 308—volumetr. estimat., Stas. xix, 202; Volhard. xxv, 266—pure, Ebelmen. xxiii, 310; Solthien. xxix, 280; Dachauer. xix, 201—fr. photographic baths, Bibra. xxv, 266; Robinson. xviii, 240—limit of react. with pot. xanthogenate, Wagner. xxx, 286—reduction (phosph. ether), Krüger. xxi, 316; (hydrogen), Scholig. xxv, 240—finely reduced retains up to 80 p. c. water, Vogel. xxiii, 310—*SALTS*, act. of light in presence of mercury cpds, Schnauss. xxiii, 308; of organic matter, Leffmann. xxx, 309; of trimethylamine, Vincent. xxv, 316—presence of selenium, Debray. xxiv, 263—spongy, Böttger. xxvii, 372—test, Volhard. xxvii, 322.
- *ALUM*, Kern. xxiii, 311.
- and *ALUMINIUM SULPHATE*, Kern. xxiii, 311.
- *AMIDOSULPHONATE*, Berglund. xxvii, 331.
- *AMMONIO-NITRATE* as test for peroxide hydrogen, Böttger. xxii, 174.
- *ARSENIDE*, Dechamps. xxvii, 366.
- and *CALCIUM IODIDE*, Simpson. xxix, 280.
- *CARBIDE*, Marsden. xxx, 282.
- *CARYOPHYLLINATE*, Mylius. xxii, 219.
- *CHLORIDE*, act. of light (regenerated in the dark), Morren. xviii, 241—act. of ozone, Mailfert. xxx, 259—as test for organic and inorganic acids, Smith. xviii, 241—*REDUCTION*: (ferrous oxalate), Lagrange. xxx, 309; (glycerin), Mierzinski. xviii, 241; (glucose and soda), Böttger. xxviii, 254; (coupled with zinc in a galvanic battery), Leibius. xix, 202; (by zinc and sulph. ac., is due to zinc alone and not to hydrogen), Tommasi. xxvii, 373—solubility in several salts, Vogel. xxiii, 311—separation fr. chlor. and brom, Hager. xix, 190.
- *CYANIDE*, act. of ozone, Mailfert. xxx, 259.
- *DICHLOROPROPIONATE*, Backunts and Otto. xxvi, 533.
- *ELEMENT*, Bruylants. xxvi, 468.
- *EMETIC*, Cooke. xxix, 318.
- *FLUORIDE*, Gore. xviii, 242.
- *FULMINATE*, prep. without danger, Böttger. xxv, 267.
- *GAMBOGIATE*, Costelo. xxvii, 210.
- *HYPONITRITE*, Plaats. xxvii, 296.
- *MYRISTICATE*, Flückiger. xxiii, 331.
- *NITRATE*, adult. (not purified at all). xix, 346—act. of hydrogen, Pellet. xxiii, 311; Russell. xxii, 207; of ozone, Mailfert. xxx, 259; of sulphide sod., Vidau. xxiv, 264—freed of copper, Palm. xviii, 240—discolorat. of fused, due to chloride, Bouilhon. xxii, 207—fluid volume, Candidus. xxvii, 709—cont. often gold, Shuttleworth. xxvii, 373—hypodermic solut., Powers. xxvii, 94—preparation, Bouilhon. xxii, 207; xxiii, 311; Mierzinski. xix, 202; Solthien. xxix, 280—stains removed, Grimm. xviii, 241.
- *OXIDE*, temperature of reduct. by hydrogen, Müller. xix, 138.
- *PERMANGANATE*, Martenson. xxi, 298.
- *PEROXIDE*, Böttger. xxiii, 310.
- *SESQUIOXIDE*, Berthelot. xxix, 281.
- and *SODIUM HYPOSULPHITE*, Dutch Phar. Soc. xxx, 310.
- *SULPHATE*, cryst., Braham. xxix, 281—act. of ozone, Mailfert. xxx, 259—prep., Kern. xxiii, 312.
- *SULPHIDE*, electric and chemical behavior, Skey. xxvi, 421.
- *SULPHOCHROMITE*, Gräger. xxx, 297.
- *TEROXIDE*, Berthelot. xxviii, 254.
- *TUNGSTOBORATE*, Klein. xxx, 301.
- *UREA*, Mulder. xxii, 290.
- Silvering Powder.* xxiii, 113.

- Simabr** **ANDRON**, South America. xxvi, 699; xxviii, 107—bitter principle, Tanret. xxix, 193.
 — **WALDIVIA**, bitter principle, Tanret. xxix, 193.
Simaruba FERRUGINEA, New Granada. xxviii, 167.
Simarubaceæ. xix, 270; xxiv, 165; of India. xxiv, 165.
Simmondsia CALIFORNICA. xxvii, 283.
Simplocos RACEMOSA, analysis, Hesse. xxvii, 173.
Simpson, W. xxviii, 514.
Sinalbin, fr. white mustard, Will and Laubenhimer. xxviii, 346.
Sinapis DICHOTOMA;—**S. GLAUCA**. India. xxiv, 722;—**S. JUNCEA**. xxiv, 719;—**S. NIGRA**, Kansas. xxix, 443;—**S. RAMOSA**, India. xxiv, 722.
Sinapism, see **CHARTA SINAPIS**; **PAPER**, **MUSTARD**.
Singhara=**Trapa bispinosa**, India. xxiv, 725.
Sin-i=**Magnolia yulan**, China. xxviii, 165.
Sinistrin, (of Schmiedeberg) is identical with **Scillin** (of Riche and Rémont.), Power. xxix, 124.
Sinkalin, identical with **neurin**. xxvi, 611.
Sinking fund. xx, 10, 39, 78; xxi, 84.
Sium LATIFOLIUM, poisonous; descript.; analysis, Porter; Rogers. xxv, 168, 9.
Siphon, Sedlacek. xxii, 45—for continuous filtrat., Gawalowski. xxiii, 37—for poisons, Ridout. xxiii, 38.
Sirauvandi tavil=**Atropa mandragora**, Turkestan. xxi, 215.
Sirop impondérable=**glucose**, France. xxix, 519.
Sirpoon=**Calophyllum elatum**, India. xxv, 184.
Sissoo=**Perilla arguta**, Japan. xxviii, 128.
Sisymbrium BERMUDIANUM, Kansas. xxix, 446;—**S. DEFLEXUM**, California. xix, 299;—**S. IRIS**, India. descript., Dymock. xxvi, 163;—**S. OFFICINALE**, California. xix, 299; Kansas. xxix, 444.
Siuli=**Nyctanthes arbor tristis**, India. xxviii, 126.
Sium LATIFOLIUM, as adulterant of **valerian**. xxix, 161.
Sizygium JAMBOLANUM, India, descript., Dymock. xxv, 234; xxvi, 291.
Skrej=**Gadus morrhua**, Norway. xxiii, 207.
Skunk bark=**Rhus aromatica**. xxix, 227.
Slag, for making glass. xxvii, 316—utilization. xxvii, 316.
Slateria JAPONICA, Japan. xxiii, 130.
Sloman, G. W. Annual address. xxviii, 497—inaugural address. xxvii, 772—preparations of phosphorus. xxiii, 616—cultivation of medicinal plants. xxviii, 500, 502—causes of distribut. of plants. xxviii, 501—solutions for the dispensing counter. xxix, 404.
 — discussion. xxvi, 882, 894, 895, 899, 913; xxvii, 759, 772, 793, 801; xxviii, 511, 513, 514, 536, 538, 569, 572; xxix, 507, 508; xxx, 616, 636, 656, 657.
Slurry=**commercial sulphate potassium**. xxii, 499.
Small-pox, preventing cicatrization (sulph. and red precipit.), Pennararia. xxiii, 89.
Smartweed=**Polygonum acre**, Kansas. xxix, 449.
Smilacææ. xix, 295; xxi, 208; xxii, 100; xxiii, 131; xxvii, 140; xxviii, 107; xxix, 122; xxx, 149; Kansas. xxix, 451; Mexico. xxiv, 770.
Smilacin, yield fr. the several **sarsaparillas** of commerce, Marquis. xxiii, 132.
Smilacina BIFOLIA, California. xix, 307;—**S. RACEMOSA**, Calif. xix, 307; Kansas. xxix, 447;—**S. STELLATA**, Calif. xix, 307.
Smilax ASPERA, constituents, Marquis. xxiii, 132—uses in Malta. xxvi, 167.
 — **CHINA**, rhizome is really a tuber, Sandahl. xxi, 208—constituents, Marquis. xxiii, 132—India, descript., Dymock. xxix, 122—in Turkestan. xxii, 100.
 — **PEROX**, India, China. xxi, 208;—**S. GLAUCA**, analysis, Blankenhorn. xxvii, 140; in Brazil. xxiii, 121;—**S. OVALIFOLIA**, India, descript., Dymock. xxv, 125;—**S. ROTUNDIFOLIA**;—**S. PEDUNCULARIS**, Kansas. xxix, 451;—**S. PSEUDOCHINA**, Kansas. xxix, 451; Mexico. xxiv, 770.
Smith, J. Lawrence, address. xxii, 529.
 — discussion. xxii, 529; 532, 533, 534.
Smith, R. P., coöperative work in stores. xx, 93—manufacture of glassware. xx, 90, 4.
Smith, T. and H., exhibit., Centennial. xxiv, 785.
Smoke plant=**Rhus cotinus**. xxix, 225.
Smole (AMOLE?)=**Chlorogalum pomeridianum**. xxvii, 284.
Snake root, CANADA. See **ASARUM CANADENSE**.
 — **VIRGINIA**. See **SERPENTARIA**.
Sneezeweed=**Helenium autumnale**, Maisch. xx, 233;—**Helenium puberulum**, California. xxvii, 604.
Sneezewort=**Helenium autumnale**, Kansas. xxix, 442.
Snow, yield of ammonia, Vogel. xxi, 273. See also **WATER, SNOW**.
Snowball=**Viburnum opulus**. xxvi, 242.
Snuff, ANTI-NEURALGIA, Sciffignano. xxii, 56.
Soap. See also **SAPO**; **SAVON**.
 — adult., Sharples. xxiii, 523; of powd. xxx, 577—test for alkali. xix, 159; Staß; Stein. xxi, 180—analysis, Senier, Jr. xxiii, 357; Tissandier. xix, 159—"cold" process, Fairthorne. xxix, 92; Mialhe. xxii, 83—constitution, Oudemans. xix, 159—oleic ac. soap best, Grabowsky. xxvi, 146—in pharm. prep. should always be in dry shavings, Barton. xxvii, 114—preparation, Menzies. xxix, 91, 92—in California. xxvii, 637.
 — **ALKALOIDAL**, Phar. Soc. Paris. xxvi, 145.
 — **ALMOND OIL**, best for liniment. saponis, Wood. xviii, 254.
 — **ANIMAL**, alcohol. solution, Ceresoli. xxix, 74.
 — **ANTIMONY**, Dutch Phar. Soc. xxx, 107.
 — **ARSENICAL**, for taxidermist, Ebert. xxiii, 91.
 — **CASTILE**, adult. (French chalk). xix, 62: co-coanut soap). xix, 338—drug market. xxiv, 395; xxvii, 560—Conti. xxiv, 813.
 — **CASTOR OIL**, advantages, Rimmington. xix, 159—uses, Giffard. xxvi, 145—prep., Heilman. xxiii, 358.
 — **CHAMÆLEON (permangan. pot.)** xxiv, 819.
 — **CHLORINATED**, Ebert. xxiii, 91.
 — **EAU DE COLOGNE**. xxx, 108.
 — **DIALYZED**, Dieterich. xxviii, 65.
 — **GLYCERIN**, Price's, analysis. xix, 159.
 — **GREEN**, see **SAPO VIRIDIS**.
 — **IODINE**, Ebert. xxiii, 91; xxx, 108.
 — **IODINE AND BROMINE** (for artif. Aix-la-Chapelle bath) Hager. xxvi, 145.
 — **MEDICINAL**, Barkha. sen. xxi, 180; xxvi, 144.
 — **MEDICATED**, Dutch Phar. Soc. xxx, 106—Vielhaber. xxvii, 115.
 — **MERCURIAL**, Ebert. xxiii, 91.
 — **METALLIC**, Phar. Soc. Paris. xxvi, 145.
 — **PETROLEUM**, Bastil. xxx, 108.
 — **PHOSPHORUS**. xxiv, 827.
 — **RUSSIAN**, Grabowsky. xxvi, 146.
 — **SILICATE SODA**, analysis, Schellhass. xxi, 181.
 — **SILVER**. xxi, 136.
 — **SODA**, direct fr salt, Whitelaw. xxiv, 304.
 — **SOFT**, see **SAPO VIRIDIS**.
 — **STARKEY'S**. xxiii, 92.
 — **SULPHUR, CAMPHORATED**. xxx, 108.
 — **TANNIN** xxx, 107.
 — **TAR**, Ebert. xxiii, 92—Dutch Phar. Soc. xxx, 107.
 — **TURPENTINE**. xxiii, 92—liquid, Dutch Phar. Soc. xxx, 107.
Soap bark, see **QUILLAYA**.
Soap berry=**Sapindus marginatus**, Kansas. xxix, 451.
Soap nut=**Sapindus trifolius**, India. xxvi, 166.
Soap plant=**Chlorogale pomeridianum**, Calif. xxvii, 284.
So-bushi=a spec. of **Aconite**, Japan. xxix, 173.
Socaloin, Tilden. xxiv, 378—therapeut. value, Dobson. xxvi, 616.
Societies, list, to whom **COMPLIMENTARY COPIES** are sent. xviii, 318; xix, 559; xx, 315; xxi, 662; xxii, 576; xxiii, 848; xxiv, 844; xxv, 583; xxvi, 924; xxvii, 833; xxviii, 586; xxix, 536; xxx, 675.
Soconte, Arg. Republ. xxiv, 764.
Soda (CAUSTIC) cause of presence of ammonia. xxviii, 234; California. xxvii, 620—**CRYSTALLIZED**, Hermes. xviii, 230; xix, 198—estimation: xxi, 293; in presence of alkal. carbonates and sulphides. xxvi, 374; in minerals, Knop and Hazard. xxvii, 327—**PREPARATION**: pure by Millon's base, Endemann and Prochazka.

Soda. (Continued.)

- xxix, 256; ammonia process. xxiv, 788; with current of air, Helbig. xxii, 186; salt, oxide lead, Bachet. xviii, 230; fr. salt and alumina, Grüneberg and Vorster. xxv, 254; fr. salt and superheated steam, Viedt and Cabot, Jr. xxiii, 270; fr. sodium. xix, 198; fr. sodium nitrate and carbon. calc., Lunge. xxix, 257; fr. sod. nitrate and iron, Polacci. xxi, 293; fr. sulphate, Condry. xxvii, 328; Gutzkow. xxix, 257; Hill. xxix, 257—separat. fr. alkaline earths, Pfeiffer. xxvii, 327—soluble in ether, Skey. xxvi, 477—normal solution, Fresenius. xxii, 187—test, Müller. xviii, 251.
- See also SODIUM CARBONATE.
- Soda-lime**, Merz and Tibirica. xxviii, 303.
- Sodamint**, Philadelphia Hospital. xxiv, 84.
- Soda water and syrups**, Jacobus. xxii, 64.
- Sodium**. xviii, 230; xix, 198; xxi, 293; xxii, 186; xxiii, 270; xxiv, 235; xxv, 254; xxvi, 374; xxvii, 325; xxviii, 234; xxix, 256.
- and chlorine (no action) Wanklyn. xviii, 230—dissolves in liquid anhydrous ammonia, Seely. xix, 200—hydrate, crystallized, Hermes. xviii, 230; xix, 198—preservat. of lustre (petrol. ether) Böttger. xxiii, 270; (eucalyptol), Faust and Homeyer. xxii, 222—SALTS, solubility in water, Löhle. xxix, 256.
- ACETATE, as food preservative, Sacc. xxi, 358—dissolves sulph. lead. xxii, 200.
- ALUMINATE, uses. xviii, 233.
- AMALGAM, prep. xxiv, 257; xxvi, 263, 4.
- AMIDOSULPHONATE, Berglund. xxvii, 331.
- AMYLO-DEXTRIN, Pfeiffer and Tollens. xxx, 366.
- ARSENITE, cost of home-made. xx, 206.
- ARSENIATE, of constant 14 p. c. cryst. water, Fleury. xxix, 273—comp., Lefort. xxix, 273— as test for papaverina and codeia, Tattersall. xxviii, 324, 5.
- BENZOATE. xxviii, 374—quality of commercial, Bedford. xxx, 384—differs according to source of acid, Schering. xxviii, 308—in diphtheria, Letzerich. xxviii, 309—extemporaneous, Hager. xxviii, 308—fr. toluol benz. ac., often cont. up to 15 p. c. chlorobenzoate sod., Bedford. xxx, 384—preparation: Rother. xxx, 384; Schlickum. xxvii, 462—solubility in alc., Hager. xxx, 385—therapeut. value, Klebs. xxvii, 462.
- BICARBONATE, English cont. bicarb. ammon., Koster. xxix, 358; traces of iron, Schneider. xxvii, 328—and borax in pres. of glyc. xxvi, 408—detect. of carbonate, Biltz. xviii, 231; Mebus. xxiii, 271—commercial, Bedford. xxiii, 689, 822; Squibb. xix, 524—drug market. xxi, 432, 449; xxvii, 560, 7, 8, 9—fluid volume, Candidus. xxvii, 709—excip. for pills (manna), Fairthorne. xxx, 101—solub. in alc., Candidus. xxx, 565; in water, Dibbits. xxiv, 236.
- BISULPHITE, better than hyposulphite for removing chlorine. xxii, 189—in mashing of grain. xxii, 226.
- BITARTRATE, solubl. in dilut. alc. xxviii, 233.
- BORO-CITRATE (mono-, di-, tri-), Scheibe. xxix, 320.
- BORO-DISALICYLATE, Jahns. xxvi, 538.
- BORO-SALICYLATE. xxix, 375.
- BROMIDE, cost of home-made. xx, 206—fluid volume, Candidus. xxviii, 420—prep. of pure, Castelholz. xix, 187—solubl. in alc., Candidus. xxx, 565.
- BROMOPLATINITE, Thomson. xxvi, 427.
- CARBONATE, act. upon resins, gum-resins, balsams, Hirschsohn. xxvi, 457—adult. (sulph. sod.). xix, 199—cont. arsenic, Fresenius. xviii, 230—fluid volume, Candidus. xxvii, 709—manufacture: ammonia process, history, Wachner. xxii, 35; directly fr. salt, Bohlig. xxvi, 374; fr. sulphide, Siemann. xxviii, 234. See also SODA—pure, Siebold (fr. bicarbonate). xxiv, 236; Smith (fr. oxalate). xxiii, 271; Bunge (fr. sulphate). xxii, 187—solubl. in ether, Skey. xxvi, 477.
- CARYOPHYLLINATE, Mylius. xxii, 218.
- CHLORACTATE, Norton and Tcherniak. xxvii, 3.

- Sodium CHLORATE**, Pechiney. xxx, 272—in dyspepsia, Biter. xxvi, 644.
- CHLORIDE, act. of peroxide hydrogen, Schöne. xxvii, 292, 3—perfect crystals, Rose. xxii, 188—fluid volume, Candidus. xxvii, 709—chemically pure, Siebold. xxiv, 236—soda manufact. directly from it, Viedt and Cabot, Jr. xxiii, 270—solubl. in alc., Candidus. xxx, 565.
- CINNAMATE, as antiseptic. xxx, 386.
- COPAIVATE, Géza. xxiv, 284—Lucich. xxvii, 394.
- ELEMATE, Bruylants. xxvi, 467.
- ETHYLATE, history, therapy, pharmacy, Richardson. xxvii, 408—prep., prop., Hager. xxx, 344—form of crystals, Smith. xxx, 342.
- ETHYLTHIOSULPHATE, Ramsey. xxiv, 289.
- FERROCYANIDE, Tanatar. xxix, 254.
- FORMATE as substit. for salicyl. sod., Arloing. xxviii, 303.
- GAMBOGIATE, Costelo. xxvii, 210.
- HYPOIODITE, as test for magnesia, Schlagdenhauffen. xxviii, 238.
- HYPOPHOSPHATE, acid and neutral, Sulzer. xxvi, 360, 1.
- HYPOPHOSPHITE, fluid volume, Candidus. xxvii, 709—prep., Phar. Soc. Paris. xxvi, 377—test for purity, Patrouillard. xxv, 249.
- HYPOSULPHITE, act. of ammonia vapor, Loew. xxvii, 356—formula, Bernthsen. xxx, 266; Schützenberger. xxx, 267—drug market. xxi, 432; xxvii, 567, 8, 9—fluid volume, Candidus. xxviii, 420—soluble in oil turpentine, and deprives it of its odor, Edison. xxvi, 378.
- and IRON BOROCITRATE (mono-, di-), Scheibe. xxix, 321.
- ISOBUTYL-FORMATE, Schmidt. xxvii, 457.
- ISODULCITE-, Liebermann and Hamburger. xxviii, 344.
- ISOVALENTIANATE, Schmidt. xxvii, 457.
- LACTATE, Phar. Soc. Paris. xxvi, 544.
- and MAGNESIUM CITRATE, Rother. xix, 205.
- MELILOTATE, Zwenger. xix, 267.
- MOLYBDATE, decomp. by mur. ammon., Jean. xxiii, 299.
- MONOSULPHIDE, crystals, Baudrimont. xxiv, 236.
- MYRISTICATE, Flückiger. xxiii, 331.
- NITRATE (Chili saltpetre) cont. bichr. pot., manganese, iodine. xxiii, 272—decomp. by calc. carb., Lunge. xxix, 257—peculiarities of crystallization, Ditte. xxiv, 237—deposits in Peru, Cole. xxiv, 237—hydrate, Ditte. xxiii, 272—estimat. of nitr. ac., Hager. xviii, 219—pure, Siebold. xxiv, 238.
- OLEO-STEARATE (=almond soap). xxii, 243.
- PHOSPHATE, adult. (50 p. c. sulph.), Lyons. xxiii, 519; Bedford. xxix, 433—loss in drying, Fairthorne. xxix, 60—fluid volume, Candidus. xxvii, 709.
- and POTASSIUM CITRATE, neither deliquesces nor effloresces, Puscher. xxvi, 548.
- and POTASSIUM TARTRATE (Rochelle salt), act. on yeast, Hayduck. xxx, 453—adult. (sulph. sod.). xix, 346—presence of ammonia, Holdermann. xxvi, 546—loss in drying. xxiii, 596—fluid volume, Candidus. xxvii, 709.
- QUERCETIN-, Liebermann and Hamburger. xxvii, 344.
- RICINOLEATE, as excip. for pills, Giffard. xxvi, 145—prep. xxvi, 101.
- SALICYLATE, incompatible with spir. æth. nitrosus, Gerrard. xxx, 389—physiolog. act. (impotency), Dubrisay. xxx, 389—prep., Drew. xxvii, 465; Hoffmann. xxvi, 541—table for extemporaneous prep., Hager. xxvi, 538; Squibb. xxx, 388—pure, Kennedy. xxvi, 542—avoid long exposure to air, Pennypacker. xxvi, 542—from purif. acid, Williams. xxvi, 537—test of purity, Geissler. xxix, 314; Hager. xxiv, 326; Hayden. xxvii, 465—solubility in alc., Candidus. xxx, 565—conc. solut., sp. gr., Hoffmann. xxvi, 541.
- SALICYLATE, ACID, Hoffmann. xxvi, 540.
- SALICYLSULPHITE, Pavesi. xxvi, 542.
- SANTONATE, ALBUMINATED. xxiv, 378.
- SEBATE, (fr. castor oil) Nelson. xxiii, 357.
- SILICATE, is anti-putrefactive and retards fer-

Sodium. (Continued.)

- mentation, Picot. xxi, 283—for glazing candy. xxvi, 882—precipitants of silicic acid, Flückiger. xviii, 232—not decomp. by gum arabic, sugar, dextrin, glycerin, urea, Flückiger. xix, 199; decomp. by several salts and subst., Flückiger. xix, 199; by carb. bar., sulph. lime, Hill. xxix, 257.
- SULPHATE, deposits in Caucasus. xxii, 189—loss in drying, Fairthorne. xxix, 60—fluid volume, Candidus. xxvii, 709—estimat. of magn. sulph. (sp. gr.), Arthen. xxv, 254; in sulph. magn. (oxal. ac.) Hager. xxx, 294—manuf. fr. sea brine in South France. xxviii, 234.
- SULPHITE, loss in drying, Fairthorne. xxix, 60—excip. for pills (manna) Fairthorne. xxx, 101—prep., Phar. Soc. Paris. xxvi, 378.
- SULPHOCARBOLATE, (PHENATE) fluid volume, Candidus. xxviii, 420—as purgative, Rabuteau. xxx, 353.
- SULPHO (THIO) CARBONATE, Taylor. xxx, 285.
- SULPHOCRESYLATE as purgative, Rabuteau. xxx, 353.
- SULPHOCHROMITE, Gläger. xxx, 297.
- SULPHO-METHYLATE as purgative, Rabuteau. xxvii, 411; xxviii, 282.
- SULPHO-PHENATE, see S. SULPHO-CARBOLATE.
- SULPHO-SALICYLATE, Williams. xxvi, 543—physiolog. act., Dietz. xix, 199.
- SULPHOVINATE (cont. mostly sulphate) Bussy. xxi, 499—prep., Dietz. xix, 199; Dubois. xxiii, 347; Limousin. xxi, 334; Phar. Soc. Paris. xxvi, 476; Rice. xxi, 331.
- TAUROCHOLATE. xxix, 375.
- THYMATE, Tanret. xxx, 332.
- TUNGSTATE, as test for lime, Sonstadt. xxviii, 237—decomp. by inur. ammon., Jean. xxiii, 299.
- URANATE, Lallemand. xxix, 265.
- Soh**—herb, Japanese. xxviii, 99.
- Sohaga**—natural borax, India. xxiv, 787.
- Soja hispida**, China. xxv, 236—cont. a peculiar sugar, Levallois. xxx, 245.
- Solanaceæ**. xviii, 277; xix, 289; xxi, 214; xxii, 105; xxiii, 149; xxiv, 132; xxv, 136; xxvi, 204; xxvii, 157; xxviii, 120; xxix, 138; xxx, 162; of California. xix, 305; Kansas. xxix, 451; Mexico. xxiv, 772.
- Solania**, act. of sulpho-molybdate ammon., Buckingham. xxi, 369; of reagents, Salmi. xxii, 271—decomposit. products, Salmi. xxii, 271—microsublimat. point, Blyth. xxvii, 483—fr. potato sprouts, Bach. xxii, 270—test, Helwig. xxii, 270.
- Solanidia**, behav. to reagents, Salmi. xxii, 271.
- Solanum** ANGLINE, Mauritius. xxiv, 741;—S. BUL-LATUM, Brazil. xxiii, 120;—S. CAROLINENSE, Kansas. xxix, 451;—S. INDICUM;—S. JACQUINI, India, descript., Dymock. xxviii, 120;—S. JU-BATUM, Brazil. xxiii, 120, 149;—S. LYCOPEPSI-CUM, see TOMATO;—S. NIGRUM, Chili. xxiv, 765; India, descript., Dymock. xxviii, 120; Kansas. xxix, 451;—S. NINICUM, Cape Good Hope. xxiv, 738;—S. PANICULATUM, analysis of berries, Greene. xxvi, 204;—S. SODOMEUM, analysis, Missaghi. xxiv, 132;—S. TOXICARIUM, Brazil. xxvi, 205;—S. UMBELLIFERUM, Califor-nia. xix, 305.
- Solidago** BICOLOR, analysis of flowers, Conrath. xxi, 225;—S. CALIFORNICA;—S. ELONGATA, California. xix, 302;—S. GIGANTEA, Kansas. xxix, 443;—S. MONTANA, Mexico. xxiv, 774;—S. OCCIDENTALIS, California. xix, 302;—S. ODORA, as tea, Mehan. xxviii, 146;—S. RIGIDA, Kansas. xxix, 443;—S. SPECIFORMIS, Califor-nia. xix, 302.
- Solomon's seal**, SMALL = Smilacina racemosa, Kansas. xxix, 447.
- Solubility** at high temperature, determination, Meyer. xxx, 30.
- "Solution,"** WHAT IS IT? Rosenwasser. xxx, 523.
- Solution**, see also LIQUOR; and the respective BASE.
- ACID, BORIC, Dana, Jr. xxx, 555.
- ACID. CARBOL. COMP. Hager. xxviii, 59.
- ALOES COMP. xxiv, 149.
- ALUMIN. ACETATE, Poleck; Vulpius. xxx, 89.

- Solution** AMMON. ACETATE, Thresh. xxiv, 81, 413—carbon. acid retained, Bedford. xxvii, 85—(dil. acet. ac.), Bernhardt. xxv, 84—(conc. ac.), Diehl. xxv, 84—(conc. solut.), Emmanuel. xxvii, 84; Fredericks. xxi, 182; Rother. xxix, 76—often cont. lead, Siebold. xxiii, 74.
- AMMON. CITRATE, conc., Barton. xxvii, 85.
- ARSENIC, BROMIDE, Clemens. xxv, 89; xxix, 79.
- ARSENIC, CHLORIDE, U. S. Ph. revision. xxvii, 677.
- CALC. CHLORIDE, camphorated, Pavesi. xxx, 90.
- CALC. CHLORHYDROPHOSPHATE (Coire). xxiv, 105.
- CROTON CHLORALHYDRATE, Luhn. xxiii, 76; Mason. xxii, 234.
- FOWLER'S, see SOL. POTASSIUM ARSENITE.
- HYPOPHOSPHITES (iron, soda, lime, magnesia), Gibson. xxx, 89.
- HYPOPHOSPHITES, effervescent, Gardner. xxx, 89.
- IODETI FERROSI SPIRITUOSA, Dutch Phar. Soc. xxx, 123.
- IODOBROMIDE CALC. CPD., analysis, Lyons. xxiii, 524.
- IRON ACETATE (glac. acet. ac., sod. carb.), Dohme. xxviii, 454; Rother. xxix, 10;—(let magma freeze), Mankiewicz. xxv, 85.
- IRON and AMMON. CITRO-CHLORIDE, Gardner. xxviii, 444.
- IRON and AMMON. CITRO-PHOSPHATE, Gard-ner. xxviii, 443.
- IRON and AMMON. SUCCINATE, Wenzell. xxix, 78.
- IRON BROMIDE. xxv, 88—Prince. xxiii, 75.
- IRON and CALC. PHOSPHATE, Daniel. xxiii, 96.
- IRON CHLORIDE, administered (glyc., milk), Hager. xxix, 77—is often contamin. with arse-nic, Fletcher. xxix, 77; with excess of nitr. ac., Rice. xxi, 494—estimat. of strength (permang. pot.), McCoy. xxix, 77; of free mur. ac. (carb. bol. ac.), Reale. xxviii, 221—preparation: (with dilut. alc.), Bidwell. xxiv, 481; (let stand sev-eral hours before heating), Clark. xxiv, 107; (criticism of U. S. '70 and revision formulas), Dohme. xxviii, 452; (add mur. solut. to the nitr. ac.), Shuttleworth. xxvii, 350; Hoglan; Slo-cum. xxviii, 57, 8; (solut. of chloride iron to mixed acids), Oltmanns. xxviii, 58; (iron in dilut. mixed acids), Pignett. xxv, 88; peculiar manipulat., Shuttleworth. xxi, 183.
- IRON CITRATE, Dohme. xxviii, 454.
- IRON DIALYZED, see IRON, DIALYZED.
- IRON and MANGANESE PHOSPHATE, Daniel. xxiii, 96.
- IRON NITRATE, Bower. xxv, 89.
- IRON OXYCHLORIDE, see IRON, DIALYZED.
- IRON OXYSULPHATE. xxvii, 91.
- IRON PERSULPHATE (chlorate pot.), Creuse xix, 215—(iron sulph. in dilut. mixed acids), Oltmanns. xxviii, 58.
- IRON PHOSPHATE, Daniel. xxiii, 96.
- IRON PROTOXIDE (ferrous nitrate), Gardner. xx, 218.
- IRON and QUININE PHOSPHATE, Daniel. xxiii, 96.
- IRON, QUININE and STRYCHNINE, PHOSPHATE, Daniel. xxiii, 96.
- IRON and SODIUM PYROPHOSPHATE, Phar. Soc. Paris. xxvi, 144.
- IRON and STRYCHNINE PHOSPHATE, Daniel. xxiii, 96.
- IRON, SUBCHLORIDE, see IRON, DIALYZED.
- IRON SUBSULPHATE (chlorate pot.), Creuse. xix, 215.
- GUTTA PERCHA, Willmarth. xxiv, 80.
- MAGENDIE, preserved by salicyl. ac., Keyser. xxix, 75.
- MAGNESIUM CITRATE, see under LIQUOR.
- MALASSEZ, Vulpius. xxvii, 60.
- MANGANESE PHOSPHATE, Daniel. xxiii, 96.
- MERCURY NITRATE, see LIQUOR HYDRARGYRI NITRATIS.
- PEPSIN SACCHARATED, Gardner. xxviii, 444.
- PHOSPHORUS (warm glyc. better than alc.). xxiii, 76.

- S** lution POTASSA, increase strength to suit sp. gr., Rosenthal. xxvii, 85.
- POTASSIUM ARSENITE (Fowler's solut.) preserved by borax, Müller. xxvii, 86; by glycerin, Perschne. xxx, 86—oxydizes gradually, Dannenberg. xxx, 86—prep. (caustic potassa), Wharton. xxvi, 121; small quantity of water first, Martin. xxi, 132.
- POTASSIUM CITRATE (acid and alkali separate), Hohl. xxiii, 75.
- QUINIA AMMONIATA, Bastick. xxv, 90—Squire. xxv, 90.
- SODA CHLORINATED, red color due to bicarb. sod., Schilbach. xxviii, 57—(bicarb. better than carb. sod.). xxv, 84.
- SODIUM TARTRATE, Hayhurst. xxiv, 81—Land-schütz. xxii, 84—Polk. xxiii, 75.
- ZINC HYPOCHLORITE (better than Labarraque), Fairthorne. xxix, 178.
- Sonchus OLERACEUS**, uses in Greece. xxiv, 141—Kansas. xxix, 143.
- Soot**, fr. coal cont. arsenic, iron, manganese, copper, Reinsch. xxi, 311.
- Sope Ashes**, A. D. 1610. xix, 494.
- Sophora HEPTAPHYLLA**, Japan. xxviii, 204;—*S. JAPONICA*, uses in China. xxv, 234; yellow dye fr. flowers and tops, Turkestan. xxi, 211;—*S. SPECIOSA*, analysis, Wood. xxvi, 608;—*S. TORMENTOSA*, China. xxiv, 756.
- Sophoria**, fr. seeds of *Sophora speciosa*, Wood. xxvi, 608.
- Sorbite**, fr. *Sorbus aucuparia*, Boussingault. xxi, 356.
- Sorbus AUCUPARIA**, fruit cont. malic acid, Johnson. xxx, 237.
- Sore throat**, putrid, Palmer. xxi, 140.
- Sorrel drink**, fr. *Hibiscus sabdariffa*. xxiii, 192.
- Sorrel plant**—*Hibiscus sabdariffa*, South Africa, India. xxiii, 192.
- Sousukea**—almonds in grape juice, Greece. xxiv, 170.
- South America**, pharmacy, Wheeler. xxiv, 441.
- South Carolina**, liquor license. xxii, 332—pharmacy law. xx, 60, 301; xxiv, 430, 6; xxviii, 583.
- Southern city**, for place of meeting. xx, 98; Caldwell. xviii, 197; Maisch. xix, 108; xxvi, 908.
- Southern States**, pharmacy, Caldwell. xviii, 194.
- Southern wood**—*Artemisia filifolia*, California. xxvii, 176.
- Spagnuole**, a variety of olive, Italy. xxi, 217.
- Spain**, chemicals, Centennial exhibit. xxiv, 798—drugs. xxiv, 766—pharmacy. xix, 316—pharmaceut. prep., Centennial exhibit. xxiv, 814.
- Spanish needles**—*Bidens bipinnata*, Kansas. xxix, 442.
- Sparattosperma LEUCANTHA**, Brazil, analysis, Peckolt. xxvii, 166;—*S. LITHONTRIPTICUM*, Brazil. xxx, 177.
- Sparattospermina (BIGNONINA)**, Peckolt. xxvii, 167.
- Spargancine**, fr. asparagus, Reinsch. xix, 295.
- Spargine**, fr. asparagus, Reinsch. xix, 296.
- Spartium JUNCUM**, use of fibres in Greece. xxv, 209.
- Sparteina** (fr. *scoparius*) prep., Kirchmann. xxv, 315—Merck. xxvii, 520.
- Spearmint**, cult. at Mitcham. xxiii, 150.
- Spear yellow gum tree**—Acaroid tree, Australia. xxx, 148.
- Species St. Germain**, Hancock. xxii, 340.
- Specific gravity**, how to take and record, Tilden. xxvii, 39.
- APPARATUS for liquids, Dunnington. xxviii, 26; Taylor. xxvi, 46—Sprengel. xxii, 36—for powders, Mann. xxvi, 47—for fats, Königs. xxvii, 421.
- BALANCE, Parrish. xxvi, 45—Reimann. xxvii, 40.
- and BAUMÉ, formula, Pile. xviii, 155.
- BOTTLE for INFLAMMABLE liquids, Tribe. xxii, 38.
- determined by BURETTE, Brügelmann. xxx, 29—differential method, Dittmar. xxx, 26.
- of FATS, Hager. xxvii, 28, 422; Königs. xxvii, 421.
- of LIQUIDS, Gannal. xxvii, 28, 39.
- Specific gravity of U. S. PHARMACOPEIA**, better at 60° and 77° F., Markoe. xxi, 510—Oldberg. xxi, 582.
- RULES, Bedford. xxiii, 112.
- of SMALL quantities, Wharton. xxv, 360.
- of SOLIDS, Smith. xxix, 34.
- of SUSPENDED MATTER, in liquids (by hydrometer), Siebold. xxviii, 26.
- Spectro-photometer**, Hüfner. xxvi, 85.
- Spectroscope** for fixed oils, Gilmour. xxiv, 301—reversion, Zollner. xix, 139.
- Spectrum analysis**. xix, 131, 2—applied to pharmacy, Stoddart. xviii, 206—phenomena vary with reagents employed, Köhler. xviii, 206.
- QUANTITATIVE, Hüfner. xxvi, 85.
- Speedwell**—*Veronica peregrina*, Kansas. xxix, 451.
- Spenser, Charles**, fldextr. *hydrastis canadensis*. xxx, 547.
- Spergulia ARVENSIS**, seeds in Baltic linseed, Holmes. xxx, 215;—*S. MAXIMA*;—*S. VULGARIS*. xxvi, 621.
- Spergulia**, fluorescent body in *spergulia spec.*, Harz. xxvi, 621.
- Spermacet**, sp. gr., Dieterich. xxx, 363.
- Sphacelaria SCOPARIA** in commercial Corsican moss. xxx, 141.
- Sphaeranthus MOLLIS**, India, descript., Dymock. xxvi, 160.
- Sphaerococcus LICHENOIDES**. See *FUCUS AMYLACEUS*.
- Sphendakla**—corms of *Asphodelus bulbosus*, Greece. xxx, 151.
- Spices**, price list of adulterants (!!). xxiii, 524—adult. of powd. xxiv, 403.
- India, Centennial exhibit. xxiv, 719.
- Spice bush**. See *BENZOIN ODORIFERUM*.
- Spice wood**—*Benzoin odoriferum*, Kansas. xxix, 446.
- Spider flower**—*Gynandropsis pentaphylla*, Kansas. xxix, 441.
- Spigelia**, adult. of powder. xxx, 576—volatile alkalioid, Dudley. xxviii, 157—contaminated with *hydrastis*, xxiv, 407; gathered out of season. xxv, 342—drug market. xx, 127, 143; xxi, 450; xxii, 643—substit. by *Phlox Carolina*, Brown. xxiii, 508—eighty years ago. xxvi, 849.
- Spigelia**, Dudley. xxviii, 158; xxx, 439.
- Spikenard**, California—*Aralia Californica*. xxvi, 698; xxvii, 611.
- Spilanthes ACMELEA**, India. xxviii, 145;—*S. MAURITIANA*. xxiv, 741;—*S. OLERACEA* for toothache. xxi, 224; India, descript., Dymock. xxviii, 147.
- Spiraea ARIÆFOLIA**;—*S. OPULIFOLIA*, California. xix, 301.
- Spirits**, Chinese. xxii, 33.
- Spirit lamp** (glass) for Berzelius lamp, Mohr. xxii, 38.
- Spirits**, DROP equivalents, Talbot. xxix, 34.
- ÆTHER. COMP. (omit eth. oil), Rother. xxv, 98.
- ÆTHER, hypodermic solut., Powers. xxvii, 94.
- ÆTH. NITROSUS. commercial examin., Griggs. xxiv, 288; Kennedy. xxiv, 289; Lloyd. xxiv, 413; xxv, 99; Warne. xxx, 109—decomp. by bicarb. pot., Rademaker. xviii, 245—errors in the calculat. of U. S. Ph. '70, Diehl. xxvi, 479—estimat., Eykman. xxx, 108; Feldhaus. xxvi, 478; Rosenblatt. xxvi, 478—hydrocyanic acid developed during distillation, Schoor and Schmidt. xxix, 93—and fldextr. *uva ursi*, explosion is due to tannin, Creuse. xxiv, 289; to free acid, Landis. xxiv, 289—incompatible with salicylate sod., Gerrard. xxx, 389—PREPARATION: Fairthorne. (starch, no heat) xxviii, 66; Goodman. xxvi, 482; Lloyd (ice water) xxvii, 723; Mill (pumice stone) xxvi, 480; Ph. London of 1746, '88, 1809, '36, '67. xxvi, 485; Rimmington. xxvi, 485, 6; Smeeton. xxviii, 66; Tanner. xix, 243; Williams. xxvi, 486—in Sweden is also variable, Kellström. xxix, 92—detect. of water (chlorof. or castor oil) Lloyd. xxix, 93.
- AMMON. AROMAT., McIntyre. xxiii, 606; xxiv, 97.
- AMMON. COMP., Thresh. xxix, 94.
- CAMPHOR, method of analysis. Allen. xxviii, 81—(adds water) Rother. xxv, 99.

- Spirit, CHLOROFORM** Rother. (adds water) xxv, 99—Thresh. xxix, 93.
- **CINNAMON COMP.**, Maisch. xxix, 95—Shryock. xxix, 94.
- **COCHLEARIA COMP.**, Dutch Phar. Soc. xxx, 109.
- **FORMICARUM**, Hager. xviii, 209—Gerhardt. xxix, 94.
- **FRUMENTI RECTIFICATUS**, as substit. for whisky and brandy, Miller. xxiv, 287.
- **JUNIPER COMP.**, Dutch Phar. Soc. xxx, 107—U. S. Ph., Moore. xxvii, 105.
- **LAVEND. COMP.**, cochineal better, Markoe. xxi, 520.
- **MASTICHIS COMP.**, Dutch Phar. Soc. xxx, 107.
- **MELISSA COMP.**, Dutch Phar. Soc. xxx, 109.
- **MORPHINATED**, for opium assay, Techemacher. xxv, 300.
- **NUCIS JUGLANDIS** in obstinate vomiting, Makey. xxvii, 106.
- **ODORATUS**, see **COLOGNE**.
- **ORANGE**, Hancock. xxi, 91, 120.
- **SAPONATUS**, Barkhausen. xxi, 174; xxvi, 111.
- **SAPONATUS KALINUS**, Hebra. xxi, 181.
- **VALERIAN COMP.**, Dutch Phar. Soc. xxx, 109.
- **VULNERARIUS RICORDI**, Dutch Phar. Soc. xxx, 109.
- **WALNUT**, Makey. xxvii, 106.
- Spogel seed**, see **PLANTAGO ISPAGHULA**.
- Spondias spec**, Africa, yield Senegal gum. xxv, 212.
- Sponges**, adult. (glue, powd. glass!) Pile. xxv, 512—bleaching. xxiv, 205; Bouchardat. xxi, 265; Roberts (salt, iodine). xxix, 239—artif. propagation, Austria. xxviii, 205—cultivation. xxx, 252—collect. in Tunis. xxi, 265.
- Sponge PAPER**, Gustin. xix, 171.
- **TENTS** (alcohol) Hough. xviii, 211—(acac., tragac.) McCollin. xviii, 303.
- Sponge, VEGETABLE**, Mamea sapota, Bahama. xxiv, 738.
- Spoonful**, inaccuracy, Farquharson. xxiv, 62.
- Sporobolus AIROIDES**;—S. **CRYPTANDRUS**, Utah. xxvii, 137.
- "**Sprengleim**" (nitroglyc., collod.), Nobel. xxvii, 420.
- Springs, mineral**, of California. xxvii, 614—of Saratoga, Fish. xxviii, 486.
- Springs, mineral**, analyzed: **ADAMS**, California. xxvii, 615;—**AIX-LES-BAINS**. xxvii, 617;—**AIX-LA-CHAPELLE**. xxvii, 617;—**BAGNERES DE LUCHON**. xxvii, 617;—**CALISTOGA**, California. xxvii, 616;—**CHAMPION**, Saratoga. xxviii, 493;—**COLUMBIAN**, Saratoga. xxviii, 492;—**CONGRESS**, California. xxvii, 615; Saratoga. xxviii, 492;—**CRYSTAL**, Saratoga. xxviii, 493;—**DOUGLASS**, California. xxvii, 601;—**EMPIRE**, Saratoga. xxviii, 492;—**EMS**. xxvii, 615;—**ETNA**, California. xxvii, 615;—**EUKEKA**, Saratoga. xxviii, 493;—**EXCELSIOR**, Saratoga. xxviii, 493;—**FACHINGEN**. xxvii, 615;—**GASTEIN**. xxvii, 616;—**GEYSER**, California. xxvii, 616; Saratoga. xxviii, 493;—**HAMILTON**, Saratoga. xxviii, 492;—**HATHORN**, Saratoga. xxviii, 493;—**HIGH ROCK**, Saratoga. xxviii, 492;—**KISSINGEN**, Saratoga. xxviii, 493;—**NAPA**, California. xxvii, 616;—**NEW ALMADEN**, California. xxvii, 615;—**PASO ROBLES**, California. xxvii, 617;—**PAVILLION**, Saratoga. xxviii, 492;—**PUTNAM**, Saratoga. xxviii, 492;—**RED**, Saratoga. xxviii, 492;—**SANEL**, California. xxvii, 615;—**SARATOGA "A."** xxviii, 493;—**SCHLANGENBAD**. xxvii, 616;—**SELTZER**, Saratoga. xxviii, 493;—**SKAGG'S**, California. xxvii, 616;—**SPA**. xxvii, 616;—**STAR**, Saratoga. xxviii, 492;—**SCHWALBACH**. xxvii, 616;—**UNION**, Saratoga. xxviii, 493;—**UNITED STATES**, Saratoga. xxviii, 492;—**VICHY**. xxvii, 615; Saratoga. xxviii, 493;—**WASHINGTON**, Saratoga. xxviii, 492;—**WHITE SULPHUR**, California. xxvii, 617.
- "**Spritz**," for **BROMINE** water, Reichardt. xxix, 272.
- Spruce, COMMON**—**Abies excelsa**, D. C. xxvi, 323.
- Spurge**, see **EUPHORBIA**.
- Squawberry**—**Rhus aromatica** var. **triloba**, Arizona. xxvii, 529.
- Squibb, E. R.**, acid. phosph. dilut. xxiv, 603—acid. phosph. glacial. xx, 66—acid. salicylic. xxv, 549, 551—aconite poisoning. xviii, 77—aconite root. xx, 229—censures isolat. of active principles and their use. xix, 465—alcohol buying and selling. xxi, 70, 548—alcohol, deodorized. xxv, 546—color tests of alkaloids. xxv, 524—preserving alkaloidal solutions. xxi, 96, 589—aloes. xx, 256—amber glass. xx, 94—general apparatus stand, etc. xxi, 532—bismuth and ammon. citrate. xx, 260—butter cacao. xviii, 83—cantharidal collodion. xxv, 520, 1—cantharidate of potassium. xx, 61—cantharides. xix, 457—chloral. xviii, 117; xix, 543—cologne. xxv, 546—confection of senna. xxv, 548—alterations of the Constitution. xxi, 37, 8—elixirs and substitution. xx, 80—abolition of entertainments. xx, 78—ergot. xxi, 89, 637—extr. jalap. xix, 465—fluid extracts and menstrua. xvii, 102, 161; xxviii, 550—fluidextr., how to make by weight. xix, 461—fluidextr. cantharides. xix, 461—fluidextr. senega. xix, 454—glycerin. xviii, 70—grummet. xxi, 540—homœopathy. xxi, 88—preserving hypodermic solutions. xxi, 96, 589—invitations, excursions, etc. xxi, 84—lie membership. xxv, 527—litmus paper. xix, 515 members, care in applications. xviii, 72—metrical weights and measures. xxiv, 606—minim-pipettes. xxi, 543, 4, 5—nominating committee. xxviii, 533, 542—oleates. xxv, 521, 3—opium assay. xviii, 79—pareira. xix, 500—pepsin. xviii, 73—percolator. xx, 182—pharmacopœia, reasons for deviating fr. officinal processes. xix, 468—pharmacopœia, nomenclature. xxviii, 545—what pharmacopœial preparations ought to be. xxvi, 97—revision of pharmacopœia. xxiv, 630, 640, 3, 5; xxv, 531—phosphorus. xxiv, 468, 624, 5, 6, 7, 8—physician's pocket-case. xxi, 542, 6—prohibiting import. of powd. drugs. xix, 499—priority. xxi, 83—earlier publication of papers. xxi, 81—queries not answered. xx, 54—quinine sulphate, adult. xxi, 102—repercolation. xxvi, 708—rhubarb. xviii, 97, 180, xix, 497; xx, 226; xxi, 74, 631—salaries of permanent secretary, treasurer, and reporter. xxi, 95—sarsaparilla. xxi, 95—seidlitz powder. xx, 89—signal service and weather reports. xx, 57—bicarbon. sodium. xix, 524—substitution. xx, 80—suppositories. xviii, 83—triplex pills of Dr. Francis. xx, 222—distilled water, how to keep. xxi, 90—wax. xxv, 543.
- discussion. xviii, 44, 45, 46, 47, 52, 53, 58, 63, 64, 65, 67, 68, 69, 70, 71, 72, 73, 76, 77, 78, 79, 81, 82, 83, 84, 85, 94, 95, 96, 97, 101, 102, 103, 104, 107, 109, 110, 111, 112, 113, 114, 116, 117, 122, 123, 124; xx, 35, 44, 46, 51, 54, 56, 57, 58, 61, 62, 63, 65, 66, 67, 68, 69, 70, 71, 73, 75, 76, 77, 78, 79, 80, 83, 87, 89, 90, 94; xxi, 31, 32, 33, 36, 37, 38, 44, 45, 54, 59, 61, 62, 63, 64, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 81, 83, 84, 86, 88, 89, 92, 93, 94, 95, 96, 97, 98, 102, 109; xxiv, 596, 600, 603, 606, 608, 612, 613, 616, 617, 619, 620, 621, 622, 624, 625, 626, 627, 628, 629, 630, 640, 643, 644, 645, 646, 647, 648, 649, 650, 653; xxv, 514, 515, 516, 519, 520, 521, 523, 524, 525, 527, 531, 532, 539, 540, 541, 543, 544, 546, 548, 549, 550, 551, 558, 559, 560; xxviii, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 544, 545, 547, 550, 551, 552, 553; xxx, 657.
- Squill**, adult. of powder. xxx, 577—active principle, Merck. xxviii, 108; Riche and Remont. xxix, 123—cause of itching, Chipman. xxiv, 526; Flückiger. xxiv, 672—vitality of bulb preserved by sand in cellar, Pile. xxi, 208.
- St. Louis**, drug market. xxv, 342—donation to college of pharmacy. xix, 125—pharmacy law. xxii, 331, 3.
- Stabler, R. H.** Inaugural address. xviii, 71—annual address. xix, 43—orange peel, to keep fresh. xxi, 76—active principle of bitter orange peel. xxii, 391.
- discussion. xviii, 45, 47, 52, 53, 63; xxi, 61, 69, 75, 76.
- Stacey, B. F.** Statistics of druggists in U. S. xxii, 516—honey trade of U. S. xviii, 141—medicinal plants of the Indians. xxi, 616—paraffin. xxiii, 629.

- Stachys AJUGOIDES**, California. xix, 304;—**S. AL-BICAULIS**, Chili. xxiv, 766;—**S. CHAMISSONIS**; **S. NUTTALLII**, California. xix, 305;—**S. PALUSTRIS**, Kansas. xxix, 446.
- Stachytarpheta JAMAICENSIS**, Liberia, descript., Holmes. xxvii, 163—Mauritius. xxiv, 741.
- Stains, removed.** xxx, 134—grass, grape juice. xix, 171—ink. xxx, 134—nitric acid. xxiii, 240—silver nitrate. xxiv, 264.
- Stalactite**, use in China. xxiv, 760.
- Stamp tax**, repeal. xxviii, 562.
- Stand**, for funnels, percolators, etc., Hildebrand. xxv, 43. See also **FILTERING STAND**; **PERCOLATOR STAND**.
- Stannous**, see **TIN**, **PROTO-**.
- Star anise**, descript., Eyckman. xxix, 185—varieties, Holmes. xxix, 186—yield of oil, Osse. xxiv, 276—poisonous variety, Geerts. xxix, 182. See also **ILICIUM RELIGIOSUM**.
- Star grass** = *Hypoxis erecta*, Kansas. xxix, 439.
- Star-wort**, **WATER-**, — *Callitriche verna*, Kansas. xxix, 441.
- Starches and STARCH-YIELDING PLANTS**, Ernst. xxiii, 359.
- Starch**, act. of anhydrous acet. acid, Schützenberger. xix, 261; of carbonic ac., Bachet and Savalle. xxvii, 440; of diastase, Musculus and Schwartz. xxvii, 439; Petit. xxiv, 313; of metallic ferricyanides, Bong. xxvi, 369; of paw-paw juice, Rose. xxix, 367—adult. detect. by microscope, Reed. xxvi, 505—yield of alcohol, Friedländer. xxiii, 338—combinat. with alkalis, Pfeiffer and Tollens. xxx, 366—colloid, Musculus. xxx, 367—chemical character, Musculus and Gruber. xxvii, 438—correct formula, Pfeiffer and Tollens. xxx, 366; Schützenberger. xviii, 270—crystalline, Musculus. xxx, 367—reaction with iodine prevented by yeast, Wiesner. xxix, 368—detect. of mineral adult. with chloroform. xxviii, 278—microscop. examin., Harrington. xxiv, 308; Reed. xxvi, 505—under the polarizer, Pocklington. xxiv, 312—utilization of residues of manuf., Thenius. xxvi, 510—soluble in water, Vogel. xxii, 244—conversion into sugar at high temperatures is due to presence of an acid, Soxhlet. xxx, 367—wash water cont. lactic and butyric acid, Thenius. xxvii, 459.
- Starch, ANIMAL**, in yolk of eggs, Dareste. xxi, 352.
- **ARROWROOT**, see **ARROWROOT**.
- **BARLEY**, microscop., Harrington. xxiv, 311; Reed. xxvi, 507.
- **BEAN**, microscop., Reed. xxvi, 507.
- **BUCKWHEAT**, microscop., Reed. xxvi, 509.
- **CORN**, microscop., Harrington. xxiv, 312—Reed. xxvi, 508.
- **DECAMBALLA**, Brit. Guiana. xxiv, 738.
- fr. bulbs of *FRITILLARIA IMPERIALIS*, use in France. xxi, 351.
- **GINGER**, microscop., Reed. xxvi, 510.
- **-GLOSS**, Geiseler. xxix, 57; xxx, 136.
- **IODIDE**, as antidote, Bellini. xxv, 286—behav. to reagents, Boudonneau. xxvi, 511—**SOLUBLE**. xxv, 105; prep., Petit. xix, 260—stable, Sonstadt. xxii, 244.
- **NITRATED**. xxv, 105.
- **OAT**, microscop., Reed. xxvi, 508.
- **POTATO**, act. of mur. ac., Calmberg. xxiv, 126—microscop., Harrington. xxiv, 308; Reed. xxvi, 505.
- **RICE**, adult. xxi, 504—microscop., Reed. xxvi, 508.
- **RYE**, microscop., Harrington. xxiv, 311—Reed. xxvi, 507.
- **SALICYLATED**, Kersch. xxix, 91.
- **SOLUBLE**, Musculus and Gruber. xxvii, 438—Zulkowsky. xxix, 307.
- **TAPIOCA**, see **TAPIOCA**.
- fr. *TRITICUM REPENS*, descript., Plauchud. xxvi, 181.
- **TURMERIC**, microscop., Reed., xxvi, 510.
- **WHEAT**, act. of mur. acid, Calmberg. xxiv, 126—microscop., Harrington. xxiv, 311; Reed. xxvi, 506.
- Statice ANTARCTICA**, Arg. Republ. xxvii, 155;—**S. BRASILIENSIS**, account, Symes. xxvii, 153;—**S. CAROLINIANA**, examin., Reed. xxviii, 119;—**S. MUCRONATA**, Morocco. xxiii, 148.
- Stavesacre**, parasiticide prop. due to fixed oil, Squire. xxv, 171.
- Steam BATH**, what is it? Squibb. xxi, 94.
- **GENERATOR**, Garrison. xxx, 44.
- **HEATING APPARATUS** for laboratories, Parrish. xxi, 128.
- Steapsin**, fr. pancreas, Defresne. xxvii, 545.
- Stearin**, see also **ACID**, **STEARIC**.—adult. (paraffin) detect. by benzin, Donath. xxiii, 524—sp. gr., Dieterich. xxx, 363; Hager. xxvii, 424.
- Steatina**, ointments with suet as a base, Mielck. xxx, 60.
- Steatinum BELLADONNÆ**;—**S. CHLORALI**;—**S. CHLORALICAMPHORATUM**. xxx, 60;—**S. CHLOROFORMI**;—**S. IODATUM**;—**IODOFORMI**. xxx, 61;—**S. MERCURIALE**. xxx, 62;—**S. OPIATUM**;—**S. PICEATUM**. xxx, 61;—**S. SUBLIMATI**;—**S. THYMOLATUM**;—**S. VERATRINÆ**;—**S. ZINCI BENZOATUM**. xxx, 62.
- Steele, Jas. G.** Coca. xxvi, 774—*Grindelia robusta*. xxiii, 637—report on drug market of San Francisco. xxiv, 401; xxvii, 562.
- Steckel tea** = *Borbonia parviflora*, South Africa. xxii, 150.
- Stellaria MEDIA**, California. xix, 299.
- Stemone SESSILIFOLIA**, Japan. xxviii, 110.
- Stenographer**, local or permanent. xxvii, 776.
- Sterculia ACUMINATA**. xxvi, 253. See also **COLA ACUMINATA**.
- **GUTTATA**, examin. of gum, Masing. xxix, 214;—**S. SCAPHIGERA**, China. xxvi, 252;—**S. URENS**, examin. of gum, Masing. xxix, 214; India. xxiv, 718; descript., Dymock. xxvi, 161;—**S. VILLOSA**, examin. of gum, Masing. xxix, 214.
- Sterculiaceæ**. xxi, 235; xxiv, 167; xxvi, 252—yield Senegal gum. xxv, 212.
- Stevoglia ORIENTALIS**, India. xxviii, 135.
- Stewards, ARMY and NAVY**. xxx, 659.
- Stibianite**, California. xxvii, 585.
- Stigmata MAIDIS**, see **MAIZE**.
- Stilbene**, for product. of phenanthren, Gräbe. xxii, 212.
- Still**, see also **DISTILLING APPARATUS**—cleaning (carb. ammon.), Carles. xxix, 49.
- **PHARMACEUTICAL**, Curtman. xix, 117—(steam injector), Müller. xxvi, 72—Remington. xxvi, 71; xxvii, 51—Rice. xxvi, 76—(vertical stirrer), Sennecke. xxviii, 33—(**FRACTIONAL DISTILLATION**), Bevan. xxvi, 75—(**VACUUM**), Lenz. xxvi, 74.
- Stillingia SEBIFERA**. xxi, 144, 259;—**S. SYLVESTRIS**, adult. of powd. xxx, 577.
- Stink bark** = *Rhus aromatica*. xxix, 227.
- Stink blaaren**, Cape of Good Hope. xxiv, 738.
- Stomach pump**, substit. by l. R. syphon, Hodggen. xix, 167.
- Stone, ARTIFICIAL**, California. xxvii, 621.
- **PRESERVED** in moist climate by sulph. copper. xix, 208.
- Stone crop** = *Penthorum sedoides*, Kansas. xxix, 443;—**S. MOSSY**, see **SEDUM ACRE**.
- Stone seed** = *Lithospermum arvense*, Kansas. xxix, 440.
- Stone ware, PANS and STILLs** heated (paraffin oil), Coffey. xix, 138.
- Stop cock**, Hart. xxviii, 39.
- Storax**, difference between Oriental and American, Maisch. xxii, 113—behav. to reagents, Hirschsohn. xxvi, 453—constituents, Müller. xxiii, 158, 160—fractional distillation, Laubenheimer. xxi, 222—detect. of turpentine, Hager. xxiii, 161, 511—in itch, Facilides. xxi, 222—in Mexico. xxiv, 768.
- **IN GRANIS**, Möller. xxiii, 158, 9.
- Strainer**, with removable cloth, Müller. xxvi, 66—porcelain, Christel. xxvi, 66.
- Stramonium leaves**, adult. of powd. xxx, 577—alkaloids, Ladenburg. xxviii, 336; Schmidt. xxix, 335—extract. of alkaloids, Günther. xix, 289; Wasilewsky. xxv, 136—uses in the Voodoo rite, Haiti. xxvii, 159—eighty years ago. xxvi, 849.
- Strawberry**, see **FRAGARIA VESCA**.
- Stringy bark tree** = *Eucalyptus obliqua*, Australia. xxi, 249.
- Strizzatore termopneumatico**. xxvii, 386.

Strontium. xviii, 232; xxiv, 241—prep., Franz. xviii, 232.
 — **AMIDOLULPHONATE**, Berglund xxvii, 331.
 — **BICHROMATE**, Preis and Rayman. xxix, 267.
 — **BORATE**, Datto. xxii, 184.
 — **GAMBOGIATE**, Costelo. xxvii, 210.
 — and **IRON MECONATE**, Rennie. xxix, 315.
 — **OXIDE**, crystals, Brügelman. xxvii, 332.
 — **SACCHARATE**, Scheibler. xxx, 371.
 — **SULPHATE**, soluble in sulph. ac., Struve. xviii, 224.
 — **SULPHIDE**, Kern. xxiv, 241.
 — **SULPHO-CHROMITE**, Gräger. xxx, 297.
Strophanthin, fr. *Strophanthus hispidus*, Hardy and Gallois. xxv, 150.
Strophanthus hispidus, analysis, Hardy and Gallois. xxv, 28, 150—arrow poison, Africa. xxix, 117—descript., Fraser. xxi, 221.
 — **KOMBÉ**. xxix, 117.
Strychnia, ACTION of arseniate sod., Tattersall. xxviii, 324, 5—of ferric chlor., butter antimony, stannous chlor., Godeffroy. xxvi, 559—of light, Flückiger. xxvi, 577—of sulpho-molybdate ammon., Buckingham. xxi, 369—of sulph. ac. and sugar, Hamlin, Jr. xxix, 325—of bichrom. mixt., chlorin. lime, Hamlin, Jr. xxix, 325—of sulph. hydrogen, Schmidt. xxiii, 389; xxiv, 343.
 — **ANTIDOTE** to chloral and *vice versa*, Liebreich. xviii, 256; Husemann. xxvii, 507 (denied by Oré. xxi, 335); tannin, chloral, chlorof., Hager. xxviii, 92; monobromated camphor, Valentin y Vivo. xxiii, 330—as antiseptic and antifermentative, Pavesi. xxix, 335—detect. in beer, Drägendorff. xxx, 339; Wittstein. xxiii, 340—separat. of brucia, Prescott. xxvi, 806—by conversion from brucia, Sonnenschein. xxiii, 419, 420 (a mistake, Cownley. xxiv, 353; Shenstone. xxv, 807)—distinct fr. curarina, Flückiger. xxii, 272—electrolysis, Bourgoin. xix, 223—estimation, Thresh. xxviii, 320—extract. (coal oil), Boiraux and Léger. xxiii, 418; (ether, chlorof.), Allen. xxx, 420—hydrate, Jahn. xxix, 334—incompatible with biniodides, iodides, chlorides, Lyons. xxvi, 587—poisoning through format. of iodide in the vial, Bullock. xviii, 293—microsublimating point, Blyth. xxvii, 483—separat. fr. quinia (oxal. ammon.), Dwar. xxviii, 327—soluble in alc., Lafean. xxix, 324—spectrum, Meyer. xxvii, 479, 482.
 — **TEST** (ceroso-ceric oxide), Sonnenschein. xix, 226—(iodic acid), Seleni. xxviii, 322—(binoxide manganese), Allen. xxvi, 586—(comparison of color tests), Wenzell. xix, 227—(sulph. ac., ferric chlor.), How. xxvi, 560—(zinc chloride), Jorisson. xxix, 267.
 — with **BILIARY ACIDS**, de l'Arbre. xxi, 371.
 — **HYDROBROMATE**, Bullock. xxiii, 705, 6—McDonald. xxi, 370.
 — **HYDROCYANATE**, does not exist, Flückiger. xxi, 370.
 — compound with **IODOFORM**, Lextrait. xxx, 421.
 — **IODOMERCURATE**, Jackson and Payne. xxx, 399, 400.
 — **METHYL-IODIDE**, produces symptoms of curare poisoning and not of strychnia, Crum Brown; Frazer. xviii, 292.
 — **NITRATE**, hypodermic solut., Powers. xxvii, 94.
 — **NITROPRUSSIDE**, Davy. xxix, 325.
 — **SULPHATE**, hypodermic solut., Powers. xxvii, 94—neutral, Rammelsberg. xxx, 420.
 — **TRI-IODIDE**, Bauer. xxiii, 419.
 — **TUNGSTOBORATE**, Klein. xxx, 302.
Strychnos, review of genus, Planchon. xxix, 149.
 — **CASTELNÆI** (-ÆANA), Brazil. xxvi, 216; xxviii, 137; xxix, 152;—S. **COGENS**, Guiana. xxviii, 137; xxix, 152;—S. **COLUBRINA**, analysis of bark, Greenish. xxvii, 169; India, descript., Dymock. xxviii, 136;—S. **CREVAUXII**, Brazil. xxviii, 137; descript., Planchon. xxix, 150, 2;—S. **GUBLERI**, Brazil. xxviii, 137; xxix, 152;—S. **INNOCUA**, Africa. xxx, 181;—S. **LIGISTRINA**, India. xxvii, 170;—S. **NUX VOMICA**, uses of wood in India, Dymock. xxv, 150; examin. of bark, Greenish. xxvii, 170;—S. **POTATORUM**, India, descript., Dymock. xxviii, 136; xxx, 181; seeds

Strychnos. (Continued.)

cont. no alkaloid, Maisch. xix, 286;—S. **SCHOMBURGHII**, Guiana. xxviii, 137; xxix, 152;—S. **TOXIFERA**, Brazil. xxvi, 215; xxviii, 137; xxix, 152;—S. **TRIPLINERVA**, Brazil. xxviii, 137.
Stuart, E., fungus growth in alkaloidal solutions. xxix, 521—*Apocynum androsæmifolium* and *Ap. cannabinum*. xxix, 468.
 — discussion. xxix, 521.
Sturgeson soundes, A. D. 1610. xix, 493.
Styraceae. xxi, 222; xxii, 113; xxiii, 157; xxv, 153; xxvii, 173; xxviii, 141; xxix, 154; xxx, 188.
Styrax. See **STORAX**.
Styrol, fr. benzoin, Theegarten. xxiii, 162—yield fr. liquid storax, Miller. xxiii, 160.
"Suberin" (=cork-powder) for sore nipples, Brochard. xxvii, 278.
Sublimate, corrosive. See **CORROSIVE SUBLIMATE**.
Subupira=*Bowditchia major*, Brazil. xxv, 232.
Succinite, deposit in New Jersey, Goldsmith. xxviii, 272.
Succo agro—inspissated juice of lemons, Greece. xxix, 195.
Succus CANNIS, Martenson. xxviii, 72.
 — **CITRI DEPURATUS**, Hager. xxviii, 71.
 — **LIQUIRITIÆ DEPURATUS**. See **LICORICE, BLACK**.
 — **TARAXACI** fr. flower-stalks better than fr. root, Barton. xxi, 194.
 — See also **JUICE**.
Suckmuniya=*scammony*, India. xxv, 144.
Sueda CALIFORNICA;—S. **DIFFUSA**. xxvii, 285.
Suelda con suelda, Arg. Republ. xxiv, 762, 4.
Suet (beef and mutton), sp. gr., Dieterich. xxx, 363.
Suevern's mass, disinfectant. xix, 166.
Suffed behman=root of *Centaurea behen*, India. xxvii, 160.
Suffed kurwah = *Hymenodictyon obovatum*, India. xxv, 168.
Suffed mossli=tubers of *Asparagus ascendens*, India. xxv, 126.
Suffed-til=white-seeded sesamum, India. xxiv, 721.
Sugars, studies, Franchimont. xxviii, 294.
Sugar, of California. xxvii, 639.
 — **BEET-**, (fr. leaves), Pierre. xxvi, 513.
 — **BEET-**, (fr. root) analysis of ash, McDonald. xxvi, 512—purific. of juice. xxx, 371—inversion for wine, Engling. xxix, 309—manufact. xix, 259—fr. molasses by dialysis (osmosis), Mathée and Scheibler. xxvi, 513—quality of root in inverse ratio to bulk of crop, Durin. xxiv, 316—yield according to manure, Ladureau. xxvi, 202.
 — **BROWN**, crystallizable is converted into inactive sugar, Guyon. xxvi, 517.
 — **CANE-**, act. of anhydrous acetic ac., Schuetzenberger. xix, 261; of cupric hydroxide, Habermann. xxx, 372; of heat, glucose, mineral and organic salts, Pellet and Durin. xxvii, 411; of metallic ferricyanides, Bong. xxvi, 369; of nitrate silver, Borodylin. xxi, 353—juice cont. aconitic ac., Behr. xxvi, 514—adult., Sharples. xxii, 512—yield of alcohol, Friedländer. xxiii, 338—alcoh. fermentat. prevented by perchlor. iron, Almés. xxiv, 244—combination with alkalis, Pfeiffer and Tollens. xxx, 366—absorbs much ammonia, Laborde. xxiii, 362—analysis of ash, McDonald; Wallace. xxvi, 512—detect. of blue coloring matter, Reimann. xviii, 268—butyric acid formed by *Elodea canadensis* in solut., Schützenberger. xviii, 371—a well-defined compound with chloride potassium, Violette. xxii, 247—commercial examined, Johnson and Parkhill. xxvi, 515—converted into invert sugar at ordinary temp., Classen. xxiii, 364—by light converted into glucose, Raoult. xxi, 353; xxii, 246—estimation of crude, Scheibler. xxiii, 363; of water, mineral bases, organic acids, Langlier. xxvii, 441—one part saline matter prevents crystallization of four parts sugar, Durin. xxiv, 315—equivalent in copper, Weil. xxi, 354—Fehling's test (precautions) Boiret. xxx, 372—estimat. in commercial products, Girard. xxvi, 523; Löwe. xix, 258; Weil. xxi, 353—in flower petals,

Sugar. (Continued.)

- Boussingault. xxvi, 514; in nectar, Wilson. xxvii, 442—fluid volume, Candidus. xxvii, 709—correct formula, Pfeiffer and Tollens. xxx, 366—distinct. fr. glucose and lactose, Campani. xxii, 248—detect. of glucose, Casamajor. xxix, 308; xxx, 377; Gawalowski. xxvi, 521; Vidau. xxv, 286—cause of inversion is entirely accidental, Durin. xxvii, 411—inverting power of acids, Behr. xxvi, 517—yields iodoform, Hager. xxx, 346—freed fr. lime by phosph. ac., Scheibler. xxiii, 362—converted into mannite by algæ, Perrot. xxiii, 363—oxidat. products, Heyer. xxx, 375—uses in pharmacy, Symes. xxvi, 516—refined (chlor. barium). xxvii, 441; (bar., phosph. am.) Lagrange. xxii, 247; (sulphurous ac.) Seyfert. xix, 258—separat. fr. inverted, Dubrunfaut. xviii, 269—fr. molasses by dialysis, Dubrunfaut. xxx, 37; by fermentation, Guyon. xxix, 309; as saccharate lime, Jünnemann. xxx, 371; by strontium, Scheibler. xxx, 372—soluble in water, Courtonne. xxvi, 513; Scheibler. xxi, 353—detect. of ultramarine, Ballaud. xxvi, 515.
- GRAPE-, see GLUCOSE.
- INACTIVE (optically), Halse and Steiner. xxvi, 528.
- INVERT, estimation, Sachsse. xxvii, 446; Heinrich. xxvii, 446.
- fr. MRLONS, California. xxv, 286.
- MILK-, see MILK SUGAR.
- POTATO-, contains a bitter substance, Kedzie. xxx, 377.
- STARCH-, see GLUCOSE—by act. of diastase, Petit. xxiv, 318.
- SORGHUM, product. in U. S. xxviii, 299.
- Suico, Arg. Republ. xxiv, 763.
- Suint, see WOOLFAT.
- Sujjee—Fuller's earth, India. xxiv, 717.
- Sukhdarsan—*Crinum asiaticum*, India. xxix, 127.
- Sulfate DE QUININE PHÉNATE, Cotton. xxiv, 350.
- Sulphates, decomposit. at high temp., Boussingault. xviii, 224; by boric acid, Tate. xxix, 244—solubility in sulphur. acid, Struve. xviii, 224.
- Sulphides, ORGANIC (dyes), Croissant and Bretonnière. xxiii, 463.
- Sulpho-carbolates (fr carbonates), Guy. xviii, 249.
- Sulpho-carbonates, constitution, Gélis. xxiv, 230—double, Mermet. xxiv, 231—estimat. of bisulph. carbon, Mermet and Delachanel. xxiv, 231—test (am.-chlor.-nickel), Mermet. xxiv, 231.
- Sulpho-chromites, Gräger. xxx, 297.
- Sulphoform, Pfannkuch. xxi, 331.
- Sulphocyanides, color react. with iron destroyed by phosphates; corros. sublim.; oxalic ac., Dupré. xxiv, 233—double, Skey. xxiii, 267.
- Sulphomorphid, Arppe. xxii, 265.
- Sulphophenates, see SULPHO-CARBOLATES.
- Sulpho-urea, fr. sulphocy. am., Reynolds. xix, 236.
- Sulphovinates, prop., Berthelot. xxi, 230.
- Sulphur. xviii, 222; xix, 191; xxi, 274; xxii, 176; xxiii, 241; xxiv, 210; xxv, 240; xxvi, 344; xxvii, 300; xxviii, 216; xxix, 243; xxx, 264.
- adult. xix, 347; xxv, 354—American (only 15 p. c. impurities). xxiii, 241—presence of chalk detrimental to a good yield, Sestini. xxv, 240—detect. in coal gas. xix, 240—deposit in Burmah. xxii, 176; in California. xviii, 223; xxvii, 300, 597, 640; Italy. xxiv, 797; Louisiana. xviii, 222; Saba (W. I.). xviii, 222; xix, 191 (analysis, Blackwell. xxiii, 241)—estimat., Weidel and Schmidt. xxvi, 344; Fahlberg and Ives. xxvii, 301—estimat. in cokes, Sauer. xxii, 176; in pyrites, Boeckmann. xxx, 265—extracted fr. ores by coal tar oil, Widemann. xix, 192; in Sicily, de la Tour. xxx, 264—prevent fr. passing through a filter, Hager. xxiii, 241—detect. in organic compd., Vohl. xxv, 241—oxidation, Polacci. xxiv, 211—oxygen series, Berthelot. xxvi, 351—act., of ozone, Mailfert. xxx, 259—detect. in petroleum, Hager. xxv, 271; Vohl. xxv, 270—prismatic, converted into octohedrons. xxx, 265—purified, California, Nevada, Mattison. xxvii, 300—regenerated fr. alkali waste of soda-

Sulphur. (Continued.)

- works, Shaffner. xviii, 223—solubility in acet. ac., Liebermann. xxvi, 344; in coal tar oils, Widemann. xix, 192; in formic ac., Vulpius. xxvii, 301; in glycerin, Farley. xxviii, 285; in stearic ac., Vulpius. xxvii, 301—spec. grav., Spring. xxx, 264—test, Brunner. xxx, 265; Schönn. xix, 191.
- Sulphur AURATUM, detect. of arsenic. xxvii, 368.
- CHLORIDE, on the large scale, Bell. xxx, 265. See also S. OXY- and S. PROTO-.
- HYPOCHLORITE, uses. xxix, 375.
- IODIDE (only a mechanical mixture), MacIvor. xxiii, 251—soluble in glyc., Farley. xxviii, 285.
- MILK, Brady. xix, 61. See also S. PRECIPIT.
- OXYCHLORIDE, Ogier. xxx, 266.
- OXYTETRACHLORIDE, Michaelis. xxii, 176.
- PRECIPITATE, adult. xix, 346; xxiv, 416; xxv, 241—in examin. allowance to be made for water in sulph. lime, Croft. xxvi, 345—handsomer with less mur. ac., Siebold. xxvi, 344.
- PROTOCHLORIDE, act. upon fixed oils, Mercier. xxvi, 346.
- SESQUIOXIDE, Weber. xxiv, 212.
- Sulphurets, TEST PAPER, Mohr. xxii, 52.
- Sulphuretted hydrogen. See HYDROGEN, SULPHURETTED.
- Sulphuryl, CHLORIDE. xxx, 266.
- Sumach, cultivat. in Italy. xxx, 246—drug market, Richmond (Va.). xxvi, 647—cont. quercitrin, Löwe. xxii, 276—tannin identical with gallo-tannin, Löwe. xxii, 157—estimat. of tannin, Simpkin. xxiv, 341—amount of tannin at diff. periods of growth, Magagno. xxviii, 191.
- DWARF, = *Rhus copallina*, Kansas. xxix, 440;—S. STAGHORN, = *Rhus typhina*, Canada. xxix, 226;—S. SWEET, = *Rhus aromatica*, Kansas. xxix, 440.
- Sumbul, flowering at Moscow. xix, 277—descript. xxiv, 174; Wittmann. xxv, 171.
- =a spec. of valerian, India. xxvii, 180,—=root of *Dorema ammoniacum* perfumed with musk, Bombay. xxiv, 154.
- Sumbul-i-hindi = *Nardostachys Jatamansi*, India. xxvii, 180.
- Sundew. See DROSERA.
- Sunflower. See HELIANTHUS—seeds cont. no cryst. albuminoids, Ritthausen. xxx, 449.
- WILD = *Wyethia helenoides*, California. xxvii, 613.
- Supari-che-phool = *Salmalia malabarica*, India. xxv, 233.
- Superbin, fr. *Gloriosa superba*, Warden. xxx, 151.
- Suppositories, Brady. xix, 83—Goodman. xix, 160—Rother. xxi, 184—discussions. xviii, 83; xxii, 500—(MOULD vs. HANDS), Hancock. xxii, 502; Saunders. xxii, 500; Wells. xxii, 500—(APPARATUS NOT absolutely NECESSARY), Diehl. xxiv, 31; Ferguson. xix, 480; Judge. xxii, 501, 2; Kemble. xxiii, 93; Kennedy. xxii, 383, 501, 2; xxiii, 92; Partridge. xxi, 135; Peixotto. xxii, 502; Sulzer. xxiv, 98—(MOULD preferred), Mattison. xxiii, 92; Remington. xxii, 503; Wells. xxii, 500.
- EXTRACTS, to incorporate. xxiv, 98; as powder, Archibald. xxvii, 109; Hogan. xxv, 100—details of MANIPULAT. xxiv, 97, 8; Addington. xxi, 184; Fairthorne. xxi, 134; xxix, 250; Mattison. xxii, 500, 503; Reed. xxx, 112; Wright. xviii, 209—MASS, Eberle. xviii, 150; xix, 160; Ewing. xix, 159; Gerrard. xxi, 183; Müller. xxx, 112.
- COLD PRESSED, Archibald. xxvii, 107; Berquier. xxviii, 70; Dawidow. xxviii, 68.
- MOULD of plaster Paris, Dwight. xxi, 184; paper, Ellis. xxiii, 93; wax paper, Koch. xviii, 209—mould (separates horizontally across supposit.), Gerrard. xix, 135; (circular apparatus), Lee. xxviii, 71; (Knowlson and Sloan for cold pressed; Benton, Myers, Cantfield for hot), Mattison. xxiii, 625; (compressed pill mach. principle), Painter. xxvii, 106.
- SIZE, Brady. xix, 85.
- GELATIN, Brad. xix, 84; Hancock. xxii, 504—wooden moulds. xxvii, 109.

- Suppositories URETHRAL**, Brady. xix, 85—Lemberger. xix, 482.
 — **VAGINAL**. xxvii, 109.
Suppositoria, ASAFÆTIDA, Fairchild. xxi, 135.
 — **BELLADONNA**. xxiv, 98.
 — **CHLORAL**, Paul. xxiii, 93; xxiv, 99; xxv, 65.
 — **COPAIVA**, Wilder. xxvi, 131.
 — **NUTRIENT**, Spencer. xxx, 112.
 — **PILES**, Hillaret. xviii, 209.
 — **PLUMBI COMP**, Shuttleworth. xxiv, 181.
 — **RHATANY**. xxiv, 98.
Sussuki=*Eulalia japonica*, Japan. xxviii, 104.
Swallow wort=*Euphorbia prostrata*, Kansas. xxix, 445.
Sweden, chemicals, Centen. exhibit. xxiv, 796—pharm. prep. xxiv, 813.
Sweet Clover=*Trifolium pratense*, use by the Indians. xxi, 620.
Sweet Fern, see *COMPTONIA ASPLENIFOLIA*.
Swertia ROTATA, Japan. xxviii, 135.
Swietenia MAHOGANI, descript. of fruit and bark, Hanausek. xxvi, 269.
Swine bread=tuber of *Cyclamen*. xxv, 134.
Switzerland, chemicals, Centen. exhibit. xxiv, 796—phar. prep. xxiv, 813.
Sylvestrene, in Swedish turpentine. xxviii, 261.
Sylvine, in Stassfurt salt. xxii, 186.
Symphoricarpus OCIDENTALIS;—*S. VULGARIS*, Kansas. xxix, 441.
Symphytum ASPERRIMUM, Caucasus. xxvii, 165.
Symplocarpus KAMTSCHATICUS, California. xix, 307.
Symplocos RACEMOSA, India, descript., Dymock. xxv, 153; Loll Dey. xxx, 188.
Synanthrose, amorphous sugar in *Synantheræ* xix, 258.
Syre=*Kumys*. xxi, 200.
Syringe, FEMALE, convicts an apothecary. xxii, 333.
Syrups, Rother. xxi, 130—adult. xix, 349.
 — **DRIED**, Enders. xxiii, 93.
 — drop equivalent, Talbot. xxix, 34—non-fermentable (glycerin), Moore. xviii, 210—glucose no advantage over cane-sugar, Allaire. xxix, 406—sugar to be replaced by glycerin, Guichard. xxii, 74—**MEDICATED** (percolate drug with syrup), Davis. xxvii, 110—official criticised, Sheppard. xxviii, 72.
 — **COLD PERCOLATION**, Gadd. xxix, 95; Holmes. xxiii, 607; xxiv, 99; Hunstock. xxiv, 99; Kilmer. xxviii, 72; Klie. xxix, 95; McDonald. xxi, 126; Orynski. xix, 451.
 — **FORCED PERCOLATION**, Steros, Jr. xxviii, 73—preserved by white wine or wine vinegar, Giurleo. xxx, 113.
 — **PURIFIED** (use distilled water), Lacombe. xxx, 114.
Syrup ACACIA, (glucose), Allaire. xxix, 406—(glycerin), Mann. xxiii, 93.
 — **ACID. CITRIC.**, Lillard. xix, 165—(glucose), Allaire. xxix, 406—(peculiar manipul.), Moore. xxix, 96—(oil with magn.), Remington. xxii, 87.
 — **ACID. HYDROCOD.**, is more stable than aq. sol., Gilmore. xxx, 116—Goddling. xxx, 117.
 — **ACID SALICYL.**, Maury. xxiv, 101.
 — **ÆTHERIS**, Dutch Phar. Soc. xxx, 119.
 — **ALLII** (glucose), Allaire. xxix, 406.
 — **ALMONDS** (glucose), Allaire. xxix, 406—Hobe. xxviii, 74—dry, Enders. xxii, 88.
 — **ANTIRACHITIC**, Dutch Phar. Soc. xxx, 119.
 — **ARMORACIA IODATED**. xxv, 105.
 — **ARSENIAT. FERROSUS**, Madsen. xxiv, 102.
 — **ASAFÆTIDA**, Maisch. xxi, 130—(glycerin), Wood. xxiii, 94.
 — **ASAFÆTIDA COMPD.**, Rambo. xxi, 129.
 — **AURANTII**, see also *SYR. ORANGE*.
 — **AURANTII CORT.** Allaire, (glucose). xxix, 406—Bond. xxii, 86—Fairthorne. xxix, 96—Hallberg. xxv, 101; xxvi, 138—Kuhn. xxiv, 100—Markoe. xxi, 521—Martin. xxvi, 139—Rother. xxi, 184—Schmidt. xxviii, 73—Symes. xxi, 184.
 — **AURANT. FLOR.** Allaire, (glucose). xxix, 406—Moore. xviii, 210.
 — **AZEDARACH**, Miles. xxiii, 94.
 — **BALS. PERU**, Hobe. xxviii, 74.
 — **BOLDO**, Verne. xxiii, 94.
Syrup BUCKTHORN BERRIES, Hobe. xxviii, 75.
 — **BUTTERNUT LEAVES**, Dutch Phar. Soc. xxx, 119.
 — **CALC. CHLORHYDROPHOSPH.** xxiv, 105.
 — **CALC. LACTOPHOSPH.**, Chiles. xxi, 188—Jehl. xxiv, 104—Kelley. xxviii, 77—Langelle. xxii, 89—Ménier. xxi, 188; xxii, 89—Neergaard. xix, 161—Rother. xxi, 188—Watts. xxiv, 105.
 — **CALC. and FERRI LACTO-PHOSPH.**, Jehl. xxiv, 105.
 — **CALC. IODID.**, Dutch Phar. Soc. xxx, 120—Martin. xxiv, 101.
 — **CALC. PHOSPH.**, Dutch Phar. Soc. xxx, 121.
 — **CANADA SNAKE ROOT**, Gorder. xxiv, 101.
 — **CATECHU**. xxi, 188.
 — **CHAMOMILE**, Hobe. xxviii, 75.
 — **CHERRIES**, Hobe. xxviii, 74—Vogeler. xxviii, 428—for soda water, Miller. xxi, 186.
 — **CHLORAL**, Fairthorne. xxx, 116—Philadelphia Hospital. xxiv, 101—Plumer. xxi, 336.
 — **CHLOROFORM**, Hager. xxi, 188.
 — **CHOCOLATE**, Hurd. xxix, 97.
 — **CINCHONA FERRUGINOUS**, Iniguez. xxv, 367.
 — **CINCHONA AND IRON**, Patti. xxviii, 76.
 — **COCA**. xxv, 104.
 — **COFFEE**. xxvi, 141—Bernhardt. xxv, 103.
 — **COFFEE, IODATED**, Calvo. xxii, 88; xxiii, 95.
 — **COMPTONIA ASPLENIFOLIA**. Chiles. xxi, 88.
 — **COUGH**, Kessler. xxvii, 114—Mitchell. xxi, 130.
 — **CROCUS**, Kennedy. xix, 161.
 — **CROTON-CHLORAL**. xxvi, 142; xxvii, 113.
 — **CUBEBS**, Mitchell. xxi, 130.
 — **DEPURATIVUS** (Larrey), Dutch Phar. Soc. xxx, 119.
 — **DEXTRIN.**, = glucose (Great Britain and Germany). xxix, 519.
 — **EASTON'S**, Saunders. xxv, 107.
 — **ERIODICTYON**, see *SYR. YERBA SANTA*.
 — **EUCALYPTUS**. xxi, 186—Dutch Phar. Soc. xxx, 119—Phar. Soc. Paris. xxv, 104.
 — **FENNEL**, Hobe. xxviii, 75.
 — **FERRI BROMIDI**. xxv, 106—Dutch Phar. Soc. xxx, 119—Price. xxiii, 98—Stiles. xxiii, 98.
 — **FERRI et CALC. PHOSPH.**, Daniel. xxiii, 96.
 — **FERRI CHLORHYDROPHOSPH.**, xxvi, 142.
 — **FERRI HYPOPHOSPH.**, Carles. xxiii, 101—Diehl. xxx, 71—Dutch Phar. Soc., xxx, 120.
 — **FERRI HYPOPHOSPH. COMP.**, Polk. xxiii, 100.
 — **FERRI IODIDI**, Runyon. xxviii, 77; Betz (act. of nitr. ac.). xxvi, 142—examin. of commercial, Connor (color. with anilin green). xxvi, 142 (hasty conclusion, Betz, *ibid.*); Tschirner (var. strength). xxiii, 520—estimat., Parker. xxviii, 223; Naylor; Hooper. xxx, 117—contamin. with iodide lead, Attfield. xxi, 499; Remington. xxi, 189; Shenstone. xxiii, 99—with glucose, Allaire. xxix, 406—restore discolored (heat), Reynolds. xxv, 106—precautions in prep., Sheets. xxx, 118—**PRESERVATION**, Carles (sulphide iron). xxix, 99; Groves (liq. pot.; ac. phosph.). xxix, 98; Hammer (boil). xxiv, 102; Judge (ac. hypophosph.). xxiv, 102; Meyer (dil. hydriodic ac.). xxv, 105; Mylius (sunlight). xxix, 99; Pile (citric ac. of doubtful value) xxiv, 492; Rice (white of egg). xxiv, 664; Rother (sulphite sod.). xxv, 105; Tschirner (increase of sugar). xxiii, 98—discussion. xxiv, 664, 5.
 — **FERRI IODIDI, TASTELESS**, Remington. xxii, 90.
 — **FERRI LACTOPHOSPH.**, Hager. xxiv, 104—Jehl. xxiv, 104.
 — **FERRI ET MANGAN. IODIDI**, Lloyd. xxii, 90.
 — **FERRI ET MANGAN. PHOSPH.**, Daniel. xxiii, 96.
 — **FERRI, MANGAN., QUIN. et STRYCHN. HYPOPHOSPH.**, Polk. xxiii, 100.
 — **FERRI, MANGAN., QUIN., STRYCHN. et AMMON. COMP.**, Polk. xxiii, 100.
 — **FERRI OXIDI**. xviii, 210—Dutch Phar. Soc. xxx, 120.
 — **FERRI PHOSPHATIS**, Blackett. xxiii, 97—Daniel. xxiii, 96—Howie. xxiv, 103—Jones. xxiii, 97—Shuttleworth. xxv, 106.
 — **FERRI PHOSPH. COMP.**, Daniel. xxiii, 95.
 — **FERRI PHOSPH. C. AMMON. CITR.**, Rother. xxi, 189.

- Syrup FERRI PROTOCHLORIDI**, Fröh. xxx, 118—Gil-mour. xxix, 100—Jones. xxiv, 101—Phar. Soc. Paris. xxvi, 142.
- **FERRI PROTOCITRATIS**. xxvii, 113.
- **FERRI PROTOXIDI**. xxvii, 113.
- **FERRI ET QUINIAE PHOSPH.**, Daniel. xxiii, 96—Masson. xxvi, 143.
- **FERRI QUIN. ET STRYCHN. HYPOPHOSPH.**, Polk. xxiii, 100.
- **FERRI, QUIN. ET STRYCHN. PHOSPH.**, Blackett. xxiii, 97—Daniel. xxiii, 96—(Easton's syrup) Saunders. xxv, 106—Spohr. xxiii, 98—Watts. xxiv, 104.
- **FERRI, QUIN. ET IGNATIAE PHOSPH.**, Polk. xxi, 189.
- **FERRI ET SODII ALBUMINATIS**, Prescott. xix, 161.
- **FERRI ET SODII PYROPHOSPH.**, Phar. Soc. Paris. xxvi, 143.
- **FERRI ET STRYCHN. PHOSPH.**, Daniel. xxiii, 96.
- **FERRI, STRYCHN. ET AMMON. PHOSPH.**, Polk. xxi, 190.
- **FRANGULA**, Umney. xxiii, 94.
- **of FRUITS**, Gräger. xix, 162—Hager. xxviii, 438—Klie. xxix, 95—Neynaber. xxiv, 99—Tarks. xxvii, 111—Vogeler. xxviii, 434—test for artif. coloring, Vandevyvers. xviii, 210.
- **FUCI VESICULOSI**. xxv, 117—Dutch Phar. Soc. xxx, 119.
- **GALL. AROMAT.**, Bond. xxi, 187.
- **GERANII AROMAT.** xxi, 187.
- **GIBERTI**, Wilder. xxvi, 144.
- **GINGER**, see **SYRUP ZINGIBER**.
- **GLYCYRRHIZÆ**, Appenzeller. (extract) xxvi, 96—Brown. (root) xxv, 103—Hancock (root) xxi, 224—Hobe (root) xxviii, 75—Hogan (extract) xxv, 103—Juehling. (root) xxviii, 76—Martin. (root; extract) xxvii, 111—Reinige. (extract) xxviii, 75—Remington. (root) xxvi, 760—Scherff. (extract) xxviii, 75—Vogeler. (root) xxviii, 433—Ph. German. xxix, 97.
- **GLYCYRRHIZÆ COMP.**, Rother. xxi, 186.
- **GLYCYRRHIZÆ AROMAT.** xxvi, 141.
- **GUAIACI**, Craig. xxix, 97—Philadelphia Hospital xxiv, 101—Shinn. xviii, 148.
- **HORSE RADISH, IODIZED**. xxv, 105.
- **HYDRANGÆA ARBORESCENS**, King. xxv, 104.
- **HYPOPHOSPH. COMP.**, Hancock. xxii, 340.
- **HYPOPHOSPH. CALC., SOD. ET POT.**, Zoeller. xxx, 118.
- **HYPOPHOSPH. ET FERRI**, Diehl. xxx, 71.
- **IODIDE STARCH**. xxv, 104—Petit. xix, 260.
- **iodo-TANNICUS**. xxv, 105.
- **IPERCACUANHÆ**, Allaire (glucose). xxix, 406—Davis (percolates with syrup). xxvii, 110—(fldextr., water, filt.) Gadd. xxix, 95; Hallberg. xxv, 101; Hogan. xxiv, 100—Hoglan (evapor. with acet. ac., glyc.) xxviii, 76—Holmes (cold percol.) xxiii, 658—Lawall (acet. ac.) xxix, 95—McIntyre (fldextr., water, filt.) xxi, 185—Martin (solid extract). xxvi, 139; xxvii, 112—Moore (evap. with acet. ac., glyc.) xxvi, 139—Neynaber (1 alc., 3 wat.) xxv, 100—(fldextr., water, filt.) Richter, Jr. xxv, 100; Robbins. xxviii, 55—Sale. xix, 160—Wharton (filt. with magnes. carb.) xix, 160.
- **IRON**, see **SYRUP. FERRI**, etc.
- **JABORANDI**. xxix, 97.
- **JUGLANDIS**, Dutch Phar. Soc. xxx, 119.
- **JUGLAND. COMP.**, Hager. xxvii, 112—Dutch Phar. Soc. xxx, 119.
- **JUGLAND. COMP. CUM OLKO MORRHUÆ**, Dutch Phar. Soc. xxx, 120.
- **KRAMERIA**, Allaire (glucose). xxix, 406—Davis (percol. with syrup). xxvii, 110.
- **KINO AROMAT.** xxi, 187.
- **LACTUCARIUM**, Dutch Phar. Soc. xxx, 120—Hohenthal. xxx, 116—Lemberger. xxvi, 764—Maisch. xxvi, 141—Neynaber (1 alc., 3 wat.) xxv, 100—Schlotterbeck (liq. pot.) xxvi, 140—(objected to by Maisch. xxvi, 141).
- **LICORICE**, see **SYRUP GLYCYRRHIZÆ**.
- **LIME**, etc, see **SYRUP CALC.**, etc.
- **LIMONIS**. xxvii, 112—Allaire (glucose). xxix, 406—Dondé. xxi, 186—Fairthorne. xxx, 114—George. xxx, 115.
- Syrup MANGAN. IODIDI**. xxvii, 114—Creuse. xxi, 130.
- **MANGAN. MALATE**. xxvii, 114.
- **MANGAN. PHOSPH.**, Daniel. xxiii, 96.
- **MARSH ROSEMARY AROMAT.** xxi, 188.
- **MATICO AND POMEGRANATE**, Perret. xxv, 104.
- **MENTH. PIP.**, Hobe. xxviii, 75.
- **MULBERRY**, Vogeler. xxviii, 437.
- **NARCEINA**, Phar. Soc. Paris. xxvi, 142.
- **ORANGE**, see also **SYRUP AURANTII**.
- **ORANGE**, for soda water, Fairthorne. xxx, 114.
- **ORANGE, RED**, Mattison. xxiii, 488—George. xxx, 115.
- **PAPAÏNA**, Albrecht. xxix, 367.
- **PECTORALIS**, Philadelphia Hospital. xxiv, 101.
- **PEPPERMINT**, Hobe. xxviii, 75.
- **PEPTONE**, Petit. xxx, 116.
- **PHOSPHATIS (COMP.)**, Shuttleworth. xxv, 106—Carteighe. xix, 161—Howie. xxiv, 102; xxv, 108—Hancock. xxii, 341—Saunders. xxv, 106.
- **PHYTOLACCÆ COMP.**, Polk. xxiii, 94.
- **PILOCARPI**. xxix, 97.
- **PINE-BUDS, AQUEOUS and VINOUS**, Müller. xxix, 98.
- **POPPY FLOWERS, RED**, Hobe. xxviii, 75.
- **POTASSII IODIDI**, Philadelphia Hospital. xxiv, 101.
- **POTASSII IODIDI COMP.**, Philadelphia Hospital. xxiv, 101.
- **PRUNI VIRGIN.**, Allaire (glucose). xxix, 406—Davis (percol. with syrup). xxvii, 110—Moore. (fldextr., glyc.) xxix, 72; xxx, 115—Orynski (cold percol.) xix, 452—(glyc.) Ritter. xxv, 103; Schnabel xxii, 87—Vogeler (glyc. must not be added to the macerat. portion). xxii, 87—Walling (glyc.) xxii, 87.
- **QUEBRACHO**, Burgos. xxviii, 77.
- **RASPBERRY**, Gräger. xix, 162—Hobe. xxviii, 75—Vogeler (8 formulas). xxviii, 436—test for artif. coloring, Vogeler. xxviii, 436.
- **RHATANY**. See **SYRUP KRAMERIA**.
- **RHEI**, Allaire (glucose). xxix, 406—Davis (percol. with syrup). xxvii, 110—Hogan (ammonia). xxv, 101—Neynaber (3 alc., 5 water). xxv, 102—Rother (ammonia). xxi, 185.
- **RHEI AROMAT.**, Allaire (glucose). xxix, 406—Davis (percol. with syrup). xxvii, 110—Hallberg. xxv, 101—Hogan (ammonia) xxv, 102—Neynaber (separate percol. of rhub. and aromat.). xxv, 102—Patch (glyc.) xxx, 115—Rother (ammonia). xxi, 185.
- **RHEI IODAT.**, Husson. xxiii, 95.
- **RHEI ET POT. CARBON**, Neynaber. xxv, 102.
- **RHOEADOS**, Hobe. xxviii, 75.
- **ROSES (glucose)**, Allaire. xxix, 406.
- **RUBI (glucose)**, Allaire. xxix, 406.
- **RUBI IDÆI**, see **SYRUP. RASPBERRY**.
- **SARSAPARILLA COMP.**, Allaire (glucose). xxix, 406—Davis (percol. with syrup). xxvii, 110—Fairthorne (water only; intermitt. displacement). xxx, 115—Markoe (guaiac and roses useless). xxi, 521—Neynaber (percol. guaiac., and with this the remainder). xxv, 100—Schiller. (without guaiac). xxvi, 140.
- **SCILLÆ**, see **SYRUP SQUILLS**.
- **SENEGA**, Allaire (glucose). xxix, 406—Bedford (heat to boiling point). xx, 64—Davis (percolate with syrup). xxvii, 110—Eberle (prefers Diehl's process). xx, 64—Kennedy (ammonia). xxvii, 721—Moore (dil. alc.) xviii, 210; (not above 140° F.). xxvi, 140—Patch (ammonia, glyc.) xxx, 115—Rother (25 p. c. alc.) xx, 209—Wharton (filt. with magnes. carb.) xix, 160.
- **SENNÆ**, Moore. xxi, 129.
- **SENNÆ AROMAT.**, Hancock. xxii, 341.
- **SODII HYPOPHOSPH.**, Phar. Soc. Paris. xxvi, 144.
- **SODII SANTONATIS**, Dondé. xxi, 129.
- **SODA WATER**, frothy. xviii, 210.
- **SOOTHING, MRS. WINSLOW'S**, a poison, Mc-Nutt. xxi, 130.
- **SPEARMINT**, Hobe. xxviii, 75.
- **SQUILLS**, Allaire (glucose). xxix, 406—Davis (percol. with acet. syrup). xxvii, 110—Hallberg (boil vinegar and skim). xxv, 101—Orynski (cold percol.) xix, 452—Wharton (filt. with carb. magn.) xix, 160.

Syrup squills comp., Allaire (glucose). xxix, 406—Davis (percol. with syrup). xxvii, 110—Holmes (percol. through sugar). xxiii, 609—Orynski. cold percolat.). xix, 452—Rother (25 p. c. alc.). xx, 217.
 — **STARKE**, =glucose. xxix, 519.
 — **STRAWBERRY**, Gräger. xix, 162—Neynaber. xxiv, 99—Vogeler. xxviii, 437.
 — **TANNIN AROMAT.** xxi, 187.
 — **TAR**, Phar. Soc. Paris. xxvi, 141.
 — **TAR, IODIZED**, Bretet. xxii, 89.
 — **TOLU**, Allaire (glucose). xxix, 406—Hallberg (magnesia). xxv, 103—Orynski (cold percol.). xix, 452—McElhenie (chalk). xxix, 96.
 — **VIEIRINA**. xxvii, 183.
 — **VIOLET**, Bernbeck. xxvii, 112; xxix, 97.
 — **WALNUT COMP.**, Hager. xxvii, 112—Dutch Phar. Soc. xxx, 119.
 — **WALNUT COMP. WITH COD-LIVER OIL**, Dutch Phar. Soc. xxx, 120.
 — **WILD CHERRY**, see **SYRUP PRUNI VIRGIN**.
 — **YERBA SANTA**, Wellcome. xxiv, 135.
 — **YERBA SANTA AROMAT.**, Mosher. xxvii, 113.
 — **ZINCI BROMIDI**, Lyons. xxvii, 77.
 — **ZINGIBERIS**, Allaire (glucose). xxix, 406—Hallberg (magnesia). xxv, 103—McElhenie (chalk). xxix, 96.
Syzygium jambolanum, India. xxv, 234; xxvi, 291.

T.

Tabaquillo=*Nicotiana glauca*, Mexico. xxiv, 772.
Tabernaemontana laevis, Brazil. xxvi, 217;—T. **PACIFICA**. xxvii, 269;—T. **UTILIS**, Guiana. xxv, 373.

Tables:

ACID ACET., GLAC., p. c., Rüdorff. xviii, 255—solidifying point, Rüdorff. xviii, 255.
ACID HYDRIODIC, p. c., Topsøe. xix, 188
ACID HYDROBROMIC, p. c., Biel. xxx, 275.
ACID HYDROCYAN. in cherry laurel water, Léger. xxii, 63.
ACID MURIAT. for forming protochlor. iron, Dambier. xxv, 258.
ACID SUCCINIC, solub., Bourgoin. xxiv, 327.
ACID SULPHUROUS, p. c., Scott. xviii, 224.
ACID SULPHURIC, boiling point, Lunge. xxvi, 347; xxvii, 303—freezing point, Lunge. xxx, 268—sp. gr., Kohlrausch. xxvi, 347.
ALBUMEN, SOLUT., sp. gr. and p. c., Witz. xxiv, 387.
ALCOHOL, freezing point, Raoult. xxix, 292—sp. gr. and p. c., Robbins. xxvii, 400; Bullock. xxii, 226; Squibb. xxi, 566–572; Wenzell. xxvii, 708.
AMMONIA, AQUEOUS SOLUT., sp. gr. and p. c., Wachsmuth. xxvi, 379.
AMMONIUM BICARBONATE, solubl., Dibbits. xxiv, 239.
ANTIMONY, BLACK, analysis, Sheffield. xxiv, 415.
ANTISEPTICS, comparison, Buchholz. xxvi, 443.
ASHES OF LEAVES, Wanklyn; Wilson. xxii, 137.
ATROPIA, strength of commerc. EXTR. **BELLADONNA**, Webber. xxiv, 72.
BAUME, CORRECTED, Berthelot, Coulier, d'Almeida. xxvi, 48—Pile. xviii, 156.
BLUE PILLS, analysis, Senier. xxiv, 92.
CAFFEINA, solubl., Commaile. xxiv, 364.
CINCHONIA, solubl. in chloroform, Oudemans, Jr. xxi, 332.
COINS, U. S., weight. xxi, 580.
CREASOTE, wood tar and coal tar, reactions, Bouchard and Gimbert. xxvi, 496.
CREAM OF TARTAR, see **TABLE, POT. BITARTRATE**.
DROP-EQUIVALENTS, Talbot. xxix, 34.
DRUGS, loss in weight by **DRYING**, Wittstein. xxi, 202.
DUTY ON DRUGS, etc. (Aug. '72) xx, 132; xxiv, 398.
ELIXIRS, alkaloidal strength, Eberbach. xx, 270.
ETHER, strength of commercial, Bedford. xxiii, 722.
EXTRACTS U. S. Ph. ('60), yield and cost, Saunders. xix, 479.

Tables: (Continued.)

EXTRACT COLOCYNTH. CO., analysis, Oleson. xxv, 73.
EXTRACT OF MEAT, analysis, Chandler and Cairn. xxii, 70—Ebert. xix, 514.
FATS, sp. gr., Hager. xxvii, 424.
FIRES, COLORED, Kern. xxv, 115.
FLUID EXTRACTS, alcohol. strength, Conrad. xxx, 546—analysis, Schrank. xxiv, 710—coöperative plan, Diehl, Scheffer, Mohr, and others. xxvi, 694, 5, 6, 7.
FLUID EXTR. CANNABIS INDICA, strength, Buchmann. xxii, 73. See also **TABLE, PERCOLATION**.
FLUID EXTR. CIMICIFUGA, repercolation, Squibb. xxvi, 729, 731.
FLUID EXTR. CINCHONA, repercolation, Squibb. xxvi, 719, 722, 724.
GLYCERIN, reactions, Remington. xviii, 188; xix, 541—as solvent, Klever. xviii, 252—sp. gr., p. c., xxiv, 299; Lenz. xxix, 301; Champion and Pellet. xxii, 240; Schweikert. xxi, 344.
INVERTING POWER OF ACIDS ON CANE SUGAR, Behr. xxvi, 517.
IODINE (and kelp), yield fr. **ALGÆ**. xxvii, 134.
IRON, DIALYZED, sp. gr., p. c., Hager. xxv, 86.
IRON BY HYDROGEN, strength of commercial, Creuse. xxii, 445.
IRON PREPARATIONS, strength, Dambier. xxv, 259.
LIQUOR MAGNESII CITRATIS, analysis, Markoe. xix, 538.
MALE FERN, comparative assay according to season, Kruse. xxv, 121.
MEZQUITE GUM and acacia, reactions, Miller. xxiii, 652.
MILK, analysis, Sharples. xxiv, 557, 9, 560.
OILS, VOLATILE, color reactions, Kossow. xxvi, 433.
OPIUM, drug market, Smyrna and Constantinople. (1870-'78) xxvi, 650.
OPIUM PREPARATIONS, PH. BRIT., strength, Shuttleworth. xxiv, 181.
PERCOLATION, influence of height, Lloyd. xxvii, 700, 1, 2, 3, 4, 5—yield, Squibb. xviii, 163, 6. See also **TABLE, REPERCOLATION**.
PILLS, PLAIN and **SUGAR-COATED**, solubility, Remington. xxiii, 622.
POTASSIUM BICARBONATE, solubility, Dibbits. xxiv, 235.
POTASSIUM BITARTRATE, analysis, Royce. xxiv, 409—impurities, Rothe. xxi, 491—xxviii, 313—solubility, Kissel. xix, 198.
PROFIT ON HOME-MADE PREPARATIONS, Fredigke. xx, 206.
QUASSIA, sp. gr. and yield of percolate, Whall. xxii, 381, 2.
REPERCOLATION, yield and weight, Squibb. xxvi, 719, 722, 724, 729, 731.
SARSAPARILLA, constituents, Marquis. xxiii, 132.
SATURATIONS, Attfield. xix, 140.
SKIDLITZ POWDER, analysis, Grassly. xx, 283.
SENEGA, analysis, Schneider. xxiv, 177.
SODIUM BICARBONATE, solubility, Dibbits. xxiv, 237—comparison of commercial, Squibb. xix, 526.
SODIUM SALICYLATE, extemporaneous, Hager. xxvi, 538.
SPIR. ÆTHERIS NITROSUS, analysis, Kennedy. xxiv, 414.
STRYCHNIA, commercial, Prescott. xxvi, 807.
TINCTURES, various, compar. examin., Painter and others. xxv, 356, 7, 8, 9, 360, 1.
TINCT. IODINE, strength, Rice. xxii, 317.
TINCT. OPIUM, strength, Kennedy. xxii, 317; Prescott and Heim. xxvi, 825; Royce. xix, 450.
WINES, extracts. xxvi, 264.
WINES, CALIFORNIA and **GERMAN**, analysis, Merrick. xxiv, 172.
ZINC PERMANGANATE, solut., sp. gr., p. c., Biel. xxix, 268.

Tablets, see also LOZENGES.

— **SATURATES**;—T. **SOLUBLE**;—T. **TRITURATES**, Fuller. xxvi, 89.
 — **CARBOLIC DISINFECTANT**, Schweitzer. xxx, 130.

- Tablets, COFFEE**, Doyen. xxiii, 160.
- Tacamahac.** xxiv, 195—fr. *Elaphrium tomentosum*, Mexico. xxiv, 768.
- **ORIENTAL**—resin of *Calophyllum inophyllum*. xxvi, 256.
- of **VENEZUELA**—Balsam copaiva. xxv, 214.
- Tacha avi**—*Aithea rosea*, Japan. xxviii, 169.
- Tachydrite**, Stassfurt. xxii, 186.
- Tacout**—galls of *Tamarix articulata*, Morocco. xxvi, 281.
- Tæda**, of Pliny, = *Pinus sylvestris*, L. xxvi, 317.
- Taffetas VESICANS CANTHARIDINATUM**, Rosenberg. xxi, 177.
- Tagaray-elley**—*Cassia tora*, Japan. xxviii, 186.
- Tagetes ERRECTA**, So. Africa, for adult. of calendula. xix, 334.
- Tagonia MYSORENSIS**, India, descript., Dymock. xxv, 174.
- Ta-hai-tze** = *Sterculia scaphigera*, China. xxvi, 252.
- Ta-houang-yu**—*Otolithus maculatus*. xxii, 172.
- Tah-sun-up**—*Larrea Mexicana*, Arizona. xxvii, 206.
- Taj**—Cinnamon barks of India. xxvi, 163.
- Taja**—a curare plant, Brazil. xxvi, 216.
- Takla**—*Cassia Tora*, India. xxv, 211.
- Tak-sha**—*Alisma plantago*, Japan. xxviii, 105.
- Tala**, Arg. Republ. xxiv, 764.
- Talcum**, (FRENCH CHALK) for compressed pills and suppositories, Fairthorne. xxix, 259.
- Talimkhana**—*Asteracantha longifolia*, India. xxv, 127.
- Tallow** (BEEF; MUTTON), sp. gr., Hager. xxvii, 424—California. xxvii, 641.
- **PINEY**, fr. *Vateria indica*, comp., dal Sie. xxvii, 430.
- tree, products, Macgowan. xxi, 144—=*Stillingia sebifera*, China. xxi, 259; xxviii, 293.
- Talmakhara**—*Asteracantha longifolia*, India. xxv, 126.
- Tamananon** = *Calophyllum inophyllum*, Polynesia. xxvi, 256.
- Tamarac bark**, adult. of powd. xxx, 577.
- Tamariscinæ**. xxvi, 281.
- Tamarix ARTICULATA**, Morocco, descript. of galls, Holmes. xxvi, 281;—*T. GALLICA*;—*T. ORIENTALIS*. xxvi, 281.
- Tamaskan**, Arg. Republ. xxiv, 762.
- Tamia INTEGRIFOLIA**, Florida. xxvii, 280.
- Tampicin**, in *Tampico jalap*, Spirgatis. xix, 288.
- Tampons, SALICYL. ACID** (German army). xxviii, 89.
- Tan, COLLODION**, sulphocarb. zinc, Hager. xxiii, 49.
- Tanacetin**, prop., Leppig. xxx, 191.
- Tanacetum HIRONENSE**, California. xix, 303.
- **VULGARIS**, analysis, Leppig. xxx, 191—drug market. xxv, 336—loss in drying. xxi, 202—germinat. of seeds, Saunders. xxx, 567—flowers very slow insecticide, Kalbrunner. xxiii, 167—tanacetic acid, Marletta. xxi, 226.
- Tanacetyl-hydride**, Bruylants. xxvi, 448.
- Tané**—fungus necessary for brewing saké, Japan. xxvii, 403.
- Tan-ma-gera**—a curare plant, Brazil. xxvi, 216.
- Tanne, BALSAM**—*Abies balsamea*, D. C. xxvi, 315;—*T. EDEL*—*Abies pectinata*, D. C. xxvi, 313;—*T. PECH*—*Abies pectinata*, D. C. xxvi, 313;—*T. ROTHK*—*Abies excelsa*, D. C. xxvi, 323;—*T. WEISS*—*Abies pectinata*, D. C. xxvi, 313.
- Tanneries**, California. xxvii, 641.
- Tannin**, act. of bichromate mixt., chlorin. lime, Hamlin, Jr., xxix, 325; of metallic ferricyanides, Bong. xxvi, 369; on pepsin and protein compds., Lewin. xxix, 362—crystalloid, prep., Schering. xxix, 322—decomp. by air, Werner. xxii, 249—for the dispensing counter, Rother. xxi, 133—preferred by dyers to tannin-containing substances, Kurtz. xxi, 362.
- **ESTIMATION**: Allen (acet. lead). xxvi, 552; xxvii, 472—Davy (gelatin). xxvi, 552—Estcourt and Löwenthal (acid permang., indigo). xxx, 397—Eder (modif. of Fleck). xxvii, 472—Fleck, (acet. copper; carb. ammon.). xxvi, 552—Hammer (hide raspings). xxvi, 552—Jean (iodine). xxv, 296—Lehmann (gelatin, ammon. mur.). xxx, 397—Löwenthal (acid permang., indigo; salted gelatin). xxvi, 553; (is unreliable, Oser. xxiv, 339)—Mittentzwey (oxid. of tannin in alkal. sol.). xxvi, 553—Monier (permangan. pot.). xxvi, 553—Muntz and Ramspacher (raw hide). xxiii, 388; xxiv, 340; xxvi, 551; (is unreliable, Proctor. xxiv, 341)—Oser (Löwenthal's acid permang. method unreliable). xxiv, 339—Proctor (Muntz and Ramspacher unreliable). xxiv, 341; (Löwenthal's, best). xxvi, 551, 4—Rémont (gelatin in acid solut.) xxx, 396—Terreil (absorpt. of oxygen). xxii, 26—in dividivi, sumach, etc., Simpkin (ammon-sulph. copper). xxiv, 341—in tea, Allen. xxii, 136, 260—in wine, Carpené (ammon.-acet. zinc). xxiv, 341.
- fluid volume, Candidus. xxvii, 709—distinct fr. gallic and pyrogallic acids, Watson. xxvii, 473—no glucose is formed on converting tannin into gallic ac., Schiff. xxi, 361—is no glucoside, Schiff. xxi, 362—limit. of react. with iron, Wagner. xxx, 286—odorless, Deinz. xix, 222—pill excip. (manna), Fairthorne. xxx, 101—fr. Chinese and Japanese galls (alc. and eth., the more eth. the whiter). xxi, 362—completely soluble in water, Rotne. xix, 221—fr. gallic acid (by oxychlor. phosph.), Schiff. xxi, 362—solubl. in alc., Candidus. xxx, 564; in glyc., Farley. xxviii, 285—stains removed. xxviii, 316—test, in presence of gallic, salicyl, carb. ac., Hager, xxviii, 311.
- and **GLYCERIN PENCILS**, Schuster. xix, 167.
- **ALBUMINATE**, is better borne than tannin, Lewin. xxx, 451.
- of **ELM**, Johanson. xxvi, 555—**T. OF HOPS**,ETTI. xxiv, 330;—**T. OF OAK BARK**, prop. and constitution, Löwe. xxx, 395; extract. by dialysis, Kohlrausch. xxx, 396;—**T. OF WILLOW**, Johanson. xxvi, 555.
- Tanning material**, fr. New Zealand. xxiv, 737.
- Tanrik-kay**—fruit of *Terminalia bellerica*, India. xxvii, 233.
- Tantalum**, combinat. with carbon and nitrogen, Joly. xxiv, 253.
- Tap, MEASURING**, self-registering, Dows, Clark & Co. xxii, 47.
- **WOODEN**, cracks prevented (paraffin). xix, 175.
- Tapeworm**, bolus, Mishler. xxv, 96—pills. xxi, 76.
- Tapioca**, see also **MANIHOT**—microscop., Harrington. xxiv, 309; Reed. xxvi, 510.
- Tar, BIRCH**, uses, Maisch. xxix, 234.
- **JUNIPER**, synonyms. xxvi, 325. See also **OIL OF CADE**.
- (**WOOD**) synonyms. xxvi, 325—constituents, Tiemann and Kopper. xxx, 317—hydrocarbons, Thenius. xxvi, 431—emulsions (quillaya) Phar. Soc. Paris. xxv, 92—collect. in Georgia and Florida, Zacharias. xxvi, 327.
- Taracatin**, fr. *Blatta orientalis*, Bogomolow. xxvii, 286.
- Tarakané**—*Blatta lapponica*, Russia. xxvii, 287.
- Tar-an-jabin** (Persian)—manna of *Alhagi mauro-rum*, India. xxvii, 257, 8.
- Taraxacum**, adult. xxi, 479; xxiii, 501, 512; xxv, 354—is in the American market chiefly substit. but not adult. with chicory, Royce. xxii, 551—collection, proper time, Symes and Barnes. xxviii, 143, 4—cultivat. in Canada, Saunders. xviii, 186; in India. xxi, 224; in Octacamund. xxix, 115—loss in drying. xxi, 202—germinat. of seed, Saunders. xxx, 567.
- Taraxacum DENS LEONIS**, Kansas. xxix, 443.
- Tari**—a spec. of celery, India. xxvii, 192.
- Tarifa**—*Statice mucronata*, Morocco. xxiii, 148.
- Tariff for drugs**. xx, 132—changes. xxiv, 398—Wood's bill. xxvi, 645.
- Tarmuj**—seeds of *Citrullus vulgaris*, India. xxvii, 229.
- Tarrant's SELTZER APERIENT**, analysis, Schrage. xxiii, 88.
- Tarnat, H. P.**, discussions. xxv, 518; xxvi, 883, 909.
- Tartar, CRUDE**, see **ARGOL**—estimat. of tartr. of lime, Scheurer-Kestner. xxvii, 470—Greek. xxvi, 546.
- Tartarus BORAXATUS**, comp., Dure. xviii, 259—freed of tartr. calc. by freezing, Hirschberg. xxiv, 336—in scales, Ficus. xxi, 363.

- Tartar Emetic**, adult. xix, 347—test for arsenic (odor not reliable), Rump. xviii, 259; (sulph. hydrogen), Stromeyer. xviii, 265; (alloy with potass.), Williams. xxiii, 303—purity of commercial (up to 50 p. c. tersulphide), Remington. xix, 529—fluid volume, Candidus. xxvii, 709—prep., Puerta. xxix, 318—solubil. in alcohol, Candidus. xxx, 565; in glyc., Farley. xxviii, 285.
- Tar weed**, BLUE=*Trichostemma lanceolata*, California. xxvii, 612; —T. GREEN=*Hemizonia truncata*, California. xxvi, 698; xxvii, 612; —T. WHITE=*Hemizonia luzulæfolia*, Calif. xxvii, 612; —T. YELLOW=*Hemizonia corymbosa*, Calif. xxvii, 612.
- Tatum**=*Rhus coriaria*, Turkestan. xxi, 257.
- Tau**=*Amygdalus persica*, China. xxviii, 179.
- Tau-hoong-so**=*Veratrum album*, Japan. xxviii, 107.
- Tau-jin**=*Amygdalus persica*, China. xxviii, 179.
- Tau-ning**=*Amygdalus persica*, Japan. xxviii, 179.
- Tawai**=*Fagus Menziesii*, New Zealand. xxiv, 738.
- Tawheri**=*Weinmannia racemosa*, New Zealand. xxiv, 737.
- Tax per capita**. xxvi, 890; xxvii, 800.
- Taxina**, Marmé. xxiv, 367.
- Taxodium mucronatum**, Mexico. xxiv, 770.
- Taxus baccata**, alkaloid, Amato and Capparelli. xxix, 237—Marmé. xxiv, 367—Dragendorff. xxvi, 86—analysis of ashes of leaves, Rothe. xxv, 231—is poisonous. xxvi, 328.
- Taylor, Alfred B.**, fluid extracts and menstrua. xviii, 103—weight and measures. xviii, 103.
- discussions. xviii, 44, 45, 46, 47, 48, 52, 53, 54, 57, 63, 64, 96, 97, 103, 104, 105.
- Tayuya**=*Trianosperma tayuya*, Brazil. xxiii, 121; xxiv, 183; xxviii, 374.
- Tazma**=Ethiopian honey, comp., Villiers. xxvii, 49.
- Taznite**, Bolivia. xxx, 302.
- Tchin-tian**=Agar-agar, China. xxix, 118.
- Té de burro**, Arg. Republ. xxiv, 761; —=*Eritrichium guaphalviter*(?), Chili. xxiv, 766.
- Té limon**=*Andropogon citratus*, Mexico. xxiv, 769.
- Tea**, adult. (willow). xxi, 504; (*Epilob. angustifol.*). xxiii, 525—analysis, Allen. xxii, 135; Clark. xxiv, 422—p. c. of ashes, Wanklyn. xxii, 137—analysis of ashes, Wigner. xxiv, 168; Wilson. xxii, 138.
- CULTIVATION and preparation in China. xxii, 134—France. xxiii, 194—Georgia. xxvi, 917—India. xxx, 217—(Assam), Jamaica. xxiv, 735—Japan. xxiv, 167—Tennessee. xix, 267.
- hygroscopic property, stands in certain relations to kind, Wigner. xxiv, 168—estimat. of tannin, Allen. xxii, 136, 260; xxvii, 472; Eder. xxvii, 472—estimat. of thein, Allen. xxii, 269; Lieventhal. xxi, 382.
- AMERICAN,=*Ilex cassine*. xxiv, 200; —T. BLUE MOUNTAIN,=*Solidago odora*. xxviii, 146; —T. BOSCHJEMAN'S (So. Africa)—*Methyscophyllum glaucum*. xxii, 158; —T., BOURBON,=*Angræcum fragrans*. xxix, 131; —T., BRAZILIAN,=*Stachytarpheta jamaicensis*. xxvii, 163; —T., BUSH,=*Cyclopia genistoides* (So. Africa). xxii, 150; —C. brachypoda. xxix, 217; —T., CAPE,=several spec. of *Cyclopia*, Greenish xxix, 217; —T., DOORN,=*Cliffortia ilicifolia* (So. Africa). xxii, 148; —T., DUINEN,=*Helichrysum imbricatum* (So. Africa). xxii, 119; —T., FAHAM,=*Angræcum fragrans*. xxix, 131; —T., HOTTENTOT'S,=*Helichrysum serpyllifolium* (So. Africa) xxii, 119; —T., JERSEY,=*Ceanothus Americanus*. xxix, 450; —T., KOICHA, Japan. xxiv, 168; —T., MEXICAN,=*Chenopodium ambrosioides*. xxix, 441; —T., PARAGUAY, see MATÉ; —T., STECKREL,=*Borbonica parviflora* (So. Africa). xxii, 150; —T., TEAMSTER'S,=*Ephedra antisiphilitica*. xxvii, 285; —T., USUCHA, Japan. xxiv, 168.
- Tea plants**, SO. AFRICAN. xxii, 119, 148, 9; xxix, 217.
- Tea tree**=several spec. of *Melaleuca*, Australia. xxi, 251; xxiv, 806.
- Tebetosa**, fr. *Thevetia iccoli*, Mexico. xxiv, 798; xxv, 27, 148.
- Tecoma ipé**, cont. chrysophanic ac., Peckolt. xxii, 115.
- Tectochrysin** in poplar buds, Piccard. xxii, 162.
- Tectrion**=solut. chlorid. magnesium. xxx, 92.
- Teel seed**=*Sesamum indicum*, India. xxiv, 721.
- Teen-mun-tung**=*Melanthium cochinchinense*, China. xxviii, 109, 110.
- Teeth**, whitened (peroxide hydrogen) Sauer. xix, 178.
- Tejbul**=a spec. of *Xanthoxylum*, India, descript., Dymock. xxv, 180.
- Tejocote**=*Craegus Mexicana*, Mexico. xxiv, 776.
- Tej pat leaves**, India. xxiv, 721.
- Telini fly**=*Mylabris cichorei*, India. xx, 249, 253.
- Telni-makkhi**=*Mylabris cichorei*, India. xx, 249.
- Tellurium**. xxi, 308; xxii, 202; xxvi, 407.
- act. of ozone, Mailfert. xxx, 259—detect. in ores by sodium-amalgam, Kustel. xxii, 202—found in sulphur, Japan, Divers. xxx, 268—fr. telluride of Nagyag (Hungary), Schrötter. xxi, 308.
- Tembladerilla**, Arg. Republ. xxiv, 762.
- Temperature** in LABORATORIES, constant. xviii, 205; xix, 139.
- Ten-mada**=*Asparagus lucidus*, Japan. xxviii, 109.
- Ten-mondo**=*Asparagus lucidus*, Japan. xxviii, 109.
- Teng-ma**=*Urtica tuberosa*, Japan. xxviii, 109.
- Teng-mong-dau**=*Asparagus lucidus*, Japan. xxviii, 109.
- Tennessee College Pharmacy**, graduat. in absentia. xxiii, 830, 845; xxiv, 609—pharmacy law. xxx, 478, 494.
- Tenyu**=a spec. of aconite, Japan. xxix, 173.
- Teo**=*Justicia gendarussa*, India. xxvi, 163.
- Teori**=*Ipomæa turpethum*.
- Tephrosia PURPUREA**, India, descript., Dymock. xxvi, 161; T. VIRGINIANA, Kansas. xxix, 447.
- Ter engebin**=*Alhagi manna*, Persia. xix, 284.
- Terbia**, equival. and spectrum, Delafontaine. xxvii, 343—fluorescence of salts, Loret. xxvii, 346.
- Tereben**, fr. oil turpentine by sulphuric ac., Hager. xxvi, 437—cont. cymen, Ribau. xxii, 213.
- MURIATE, Ribau. xxii, 214.
- (of Deville) is a mixt. of cymol, terpine and camphene, Armstrong and Tilden. xxviii, 261.
- Terebenthen**, muriate, Ribau. xxii, 214.
- Terebinthaceæ**. xxi, 256; xxii, 156; xxiii, 216; xxv, 218; xxvi, 295; xxvii, 259; xxviii, 188; xxix, 222; xxx, 246; of Mexico. xxiv, 777.
- Terebinthina ARGENTORATENSIS**=Strassburg turpentine (*Abies pectinata*, D. C.). xxvi, 313.
- LARICINA=Venice turpentine (*Larix europæa*, D. C.). xxvi, 321.
- Terebenthine D'ALSACE**=Strassburg turp. xxvi, 313.
- D'AMÉRIQUE=common turpentine. xxvi, 316.
- DE BORDEAUX—(DE BOSTON)=common turpentine. xxvi, 316.
- DE BOURGOGNE=Burgundy pitch. xxvi, 323.
- DE BRIANÇON=Venice turp. xxvi, 321.
- DES MONTS CARPATHES=Carpathian balsam. (*Pinus Cembra*, L.). xxvi, 322.
- AU CITRON=Strassburg turp. xxvi, 313.
- FINE ORDINAIRE=Venice turp., xxvi, 321.
- DE HONGRIE=Hungarian balsam (*Pinus pumilio*, H.), xxvi, 322.
- DE MÉLÈZE=Venice turpentine. xxvi, 321.
- DE PIN MARITIME=common turp. xxvi, 316.
- DU SAPIN BAUMIER=bals. fir (*Abies balsamea*). xxvi, 314.
- SUISSE=Venice turp. xxvi, 321.
- Terebinto**, Arg. Republ. xxiv, 762.
- Terecamphene**. xxiii, 143.
- Teragrodera erosa**. xxiv, 509.
- Terminalia spec.**, India. xxiv, 718.
- ANGUSTIFOLIA, India. xxiv, 718; —T. BELLERICA, India, descript., Dymock. xxv, 203; xxvii, 233; —T. BELLISEA, Turkestan. xxi, 245—T. CHEBULA, India, descript., Dymock. xxvi, 232; Turkestan. xxi, 245; —T. TOMENTOSA, India. xxiv, 718.
- Terminila**, see TERMINALIA.
- Terminology**, see NOMENCLATURE.
- Ternstroemiaceæ**. xxii, 134; xxiii, 194; xxiv, 167; xxvii, 209; xxx, 217.
- Terpenes**, act. of mur. ac., Tilden. xxviii, 261; of nitrosylchloride gas. xxvi, 436—analysis,

Terpenes. (Continued)

- Tilden. xxvi, 436—orange and turpentine group, Tilden. xxvi, 436, 7.
- Terpentinbaum — *Larix europæa*. xxvi, 321.
- Terra LEMNIA;—T. MIRACULOSA SAXONIE;—T. SIGILLATA, uses in the Orient, Landerer. xxvi, 389.
- Tescalama — *Ficus nymphaefolia*, Mexico. xxiv, 768.
- Tests, BARRERSWILL, see FEHLING.
- Test papers, Mohr. xxii, 50.
- containing: BISMUTH, SUBCARBON; COBALT, PROTOCHLORIDE; LEAD, ACETATE, Mohr. xxii, 52;—PROTONITRATE MERCURY; IODIDE POTASSIUM and STARCH, Mohr. xxii, 51;—RHUBARB, Lacour. xxvii, 60;—SULPHIDE ZINC, Mohr. xxii, 52.
- for detection of acids and alkalies, Mohr. xxii, 50;—ammonia, Mohr. xxii, 51; Krouper. xxx, 289;—iron salts, Mohr. xxii, 51;—metals, which blacken with sulph. hydrog., Mohr. xxii, 52;—oxidizing substances; reducing substances, Mohr. xxii, 51;—sulphuretted hydrogen and sulphides, Mohr. xxii, 52;—urea, Musculus. xxiii, 472;—wine, Miller. xxvi, 267.
- Tet kot — *Aplotaxis auriculata*, India. xxvi, 225.
- Tetoo — *Colosanthus indica*, India. xxv, 146.
- Tetrabrom-BIACETYL-QUERCETIN. xxviii, 344.
- QUERCETIN. xxviii, 344.
- QUERCITRIN. xxviii, 344.
- Tetracodeina. xxii, 266.
- Tetra-nitrocellulose, Wolfram. xxvii, 437.
- Tetrakottai — seeds of *Strychnos potatorum*, India. xxviii, 136.
- Tetranthera CALIFORNICA. xxviii, 264;—T. LAURIFOLIA, Maurilius. xxiv, 741;—T. ROXBURGHII, India, descript., Dymock. xxv, 132.
- Teucrin fr. *Teucrium fruticans*, Ogliadoro. xxviii, 128.
- Teucrium CANADENSE, Kansas. xxix, 446;—T. FRUTICANS, analysis, Ogliadoro. xxviii, 128;—T. MARUM. xxv, 142;—T. SCORDIUM, descript., Maisch. xxv, 142.
- Texas, pharmacy law. xxx, 478, 495.
- Thalictrina fr. *Thalictrum macrocarpum*, Hanriot and Doassans. xxx, 212.
- Thalictrum ANEMONOIDES, Kansas. xxix, 450;—T. FOLIOSORUM, India, descript., Dymock. xxvi, 164;—T. MACROCARPUM, analysis, Hanriot and Doassans. xxx, 212.
- Thallen fr. American petroleum, Tweddle, Prunier, David. xxvii, 377.
- Thallium. xviii, 239; xix, 210; xxiii, 313; xxiv, 264; xxvi, 422—minerals, Nordenskjöld. xviii, 239.
- act. on nitric ac., Ackworth and Armstrong. xxvi, 343—poisonous, Rabuteau. xxiv, 264—pigments, Salter. xxvi, 422—prep. fr. flue dust, Krause. xxiv, 265—Neitzski. xxiv, 265—preserved. xix, 210.
- AMIDO-SULFONATE, Burglund. xxvii, 331.
- BIACETATE, Lescoeur. xxiv, 322.
- CHLORATE, Muir. xxiv, 266.
- IODIDES (green, yellow, black), Kncsel. xxiii, 313.
- PLATINO-CYANIDE, Friswell and Greenaway. xxvi, 422.
- TRICHLORACETATE, Clermont. xxi, 359.
- TUNGSTOBORATE, Klein. xxx, 320.
- Thamus red, fr. fruit of *Thamus communis*, Harten. xxiii, 459.
- Thao — gelatin for dressing textile goods, China. xxvi, 176.
- Thapsia AUREA, Kansas. xxix, 452.
- GARGANICA, analysis, Yvon. xxvi, 248.
- SILPHIUM, analysis, Yvon. xxvi, 248—resin more irritant than that of *Th. garganica*. xxvi, 248.
- Thatara-suva — *Glossocardia Bosvallea*, India. xxvii, 179.
- Thé arabe — flowers of *Aloysia citriodora*;—*Verbena triphylla*;—*Paronychia argentea*;—*Globularia alypum*;—*Cistus albidus*, Algeria. xxvi, 278.
- Thea ASSAMICA, Jamaica. xxiv, 735.
- Thebaicin, Hesse, xviii, 264—history. xxi, 374.
- Thebain, history. xxi, 374—antagonized by chloral

Thebain. (Continued.)

- hydrate, Husemann. xxvii, 507—forms crystallisable salts, Hesse. xviii, 264—micro-sublimating point, Blyth. xxvii, 483—physiolog. act., Ott. xxvi, 276—test (zinc chloride), Jorisson. xxix, 267.
- muriate (138 ounces exhibited by T. and H. Smith, Edinburgh), xxiv, 786.
- Thebanin, history. xxi, 374.
- Theer, FICHTEN;—T. FLUSSIGER;—T. HOLZ,—wood tar. xxvi, 325.
- Theina, see also CAFFEIN.
- estimat. in tea, Allen. xxii, 269; Patrouillard. xxviii, 337—micro-sublimating point, Blyth. xxvii, 483—prep. Fredigke xxi, 141; Thompson. xix, 231—test (euchlorine), Thompson. xix, 231.
- Theobromin, act. of iod. methyl; mur. ac., nitr. ac., baryta, Pressler. xxx, 430—comp. Treumann. xxvii, 513—estimat. in cacao and chocolate, Wolfram. xxvii, 514—microsublim. point, Blyth. xxvii, 483—oxidat. product, Maly and Bücheregger. xxix, 344—prep., Pressler. xxx, 430—"murexide" test, Treumann. xxvii, 513—fr. Xanthin, Fischer. xxx, 431—yield fr. cacao shells, Donker. xxvii, 512; xxviii, 338.
- ACETATE;—T. CHLOROPLATINATE;—T. MURIATE;—T. NITRATE;—T. SULPHATE, Pressler. xxx, 430.
- Theoline, fr. *Pinus sabiniana*, California. xxvii, 628.
- Theophrastus. xxv, 475.
- Therapeutics, definition, Royle. xxv, 397.
- Therapeutical KNOWLEDGE of pharmacists, Fairchild. xxv, 396.
- Thermochorton (of Hippocrates) = *Erythraea centaurium*. xxiv, 136.
- Thermometer, history, Tait. xxvii, 50.
- of RINIERI; SAGREDO; GALILEI; NEWTON. xxvii, 50.
- U. S. PH., Oldberg. xxi, 582.
- of 1000 DEGREES, Williams. xxiii, 112.
- Thevetia I(Y)CCOTLI, Mexico. xxiv, 773; xxv, 27—analysis, Herrera. xxiv, 798; xxv, 148.
- NERIIFOLIA, blue coloring matter, Warden. xxx, 183—constituents, Vrij. xxx, 182—uses in India, Loll Dey. xxx, 182—test (mur. ac.) Warden. xxx, 183.
- Thevetin, poisonous effect, Vrij. xxx, 182—prop., Warden. xxx, 184.
- Thevetosin, Herrera. xxiv, 798; xxv, 27, 148.
- Thingan, = *Hopea odorata*, India. xxiv, 718.
- Thiosinamin, prep., Flückiger. xxix, 290.
- Thistles, BLESSED, loss in drying. xxi, 202;—T., CANADA, = *Cirsium arvense*, Kansas. xxix, 442;—T., SOW = *Sonchus oleraceus*, Kansas. xxix, 443.
- Thohar = *Euphorbia nervifolia*, India. xxviii, 192.
- Thompson, W. B. Report on exhibit. xxx, 502.
- Thompson, W. S. Oleate of mercury. xxv, 415—Squibb's retort stand. xxii, 565.
- discussions. xxi, 62, 63, 68; xxii, 501, 544, 549, 562, 563, 565, 566; xxix, 506, 507; xxx, 619, 627, 630, 631, 635.
- Thomsen, J. J. Rhubarb. xviii, 99, 100.
- Thoria, equivalent; spectrum, Delafontaine. xxvii, 343.
- Thorium. xxiii, 283—and (29) salts, Cleve. xxiii, 283—fluorescence, Soret. xxvii, 346.
- Thornseed, anti-spre, China. xxiv, 745.
- Thorn tree—*Acacia horrida*, Cape Good Hope. xxiv, 738.
- Thridace, constituents, Buttin. xxi, 223.
- Thuja ARTICULATA, replaces sabina in Greece, Landerer. xxx, 252;—T. GIGANTEA, California. xix, 306;—T. OCCIDENTALIS, therapeut. value, Leaming. xxvi, 328;—T. ORIENTALIS in small-pox, Belgium. xxi, 262.
- Thulium (of Clève), existence doubted, Loret and Boisbaudran. xxvii, 258—prop., Clève. xxviii, 257; xxix, 261.
- Thus AMERICANUM;—T. VULGARE = Galipot. xxvi, 324.
- Thylobates BICOLOR, Colombia. xxix, 238.
- Thymelaceae. xix, 292; xxii, 101; xxiii, 140; xxv, 131; of California. xix, 305; Mexico. xxiv, 771.

- Thymol.** xxvi, 661—history; prop., Gerrard. xxvi, 442—act. upon animal ferments, Peschechonow. xxii, 220—as antiseptic, Bouillon. xviii, 250; Lewin. xxiv, 280; Willmott. xxvi, 444—liquefies with camphor, Symes. xxvii, 393—fr. covering odor of iodoform. xxx, 616—fr. oil of thyme, Neumann (A. D. 1735). xxvi, 441; Lemberger. xxx, 571—fr. oil monarda, Maisch. xxx, 617—fr. monobromated camphor and chloride zinc, Schiff. xxix, 287—fr. cuminol, Widmann. xxx, 330—fr. various sources, Flückiger. xxvi, 441—prop. xviii, 250—solubility in milk; glac. acet. ac., Holmes. xxvii, 394—test, Hammarsten and Robbert. xxx, 330—distinct. fr. carbol. ac., Hammarsten, Hirschsohn. xxx, 331—uses. xxx, 616.
- Thymus VIRGINICUS.** xxiv, 513.
- Thysanocarpus ELEGANS**;—**TH. OBLONGIFOLIUS**;—**TH. RADIANS**, California. xix, 299.
- Tian z'ang** = *Uncaria gambir*, China. xxviii, 157.
- Tiaridium INDICUM**, India, descript., Dymock. xxvi, 160—Liberia, descript., Holmes. xxvii, 165.
- Tien-hiung** = a spec. of aconite, China. xxix, 173.
- Tien-ma** = *Urtica tuberosa*, China. xxviii, 197.
- Tien-mong-tung** = *Melanthium cochinchinense*, China. xxviii, 109, 110.
- Ti-hwang** = *Rehmannia lutea*, China. xxviii, 205.
- Tikapu** = *Celmisia coriacea*, New Zealand. xxiv, 737.
- Tiktalaw** = fruit of *Lagenaria vulgaris* var. *amara*, India. xxvii, 230.
- Tilām utam**;—**T. WANGI** = Patchouli, India. xxix, 142.
- Tilia AMERICANA**, Kansas. xxix, 451;—**T. ARGENTEA**. xxii, 134;—**T. SILVESTRIS**, Chili. xxiv, 766.
- Tiliaceæ.** xxii, 134; xxvii, 208; of Kansas. xxix, 451.
- Tillee** = black-seeded sesamum. xxiv, 721.
- Timbo** = *Paullinia pinnata*, Brazil. xxv, 189;—*Physalis heterophylla*, Brazil. xxiii, 121.
- Timbonin** fr. *Paullinia pinnata*, Martin. xxv, 191.
- Timboree** = a spec. of *Diospyros*, India. xxiv, 139.
- Timpana** = *Naregamia alata*, India. xxvi, 158.
- Tin.** xviii, 138; xix, 211; xxiii, 298; xxiv, 252; xxvi, 403; xxviii, 246; xxx, 300.
- act. on nitric ac., Acworth and Armstrong. xxvi, 343—in California. xxvii, 597—detect. in presence of antimony, Muir. xxx, 301—estimation, Pellet and Alart. xxvi, 403—gray modification (brittle; low sp. gr.), Schertehl. xxviii, 246—detect. of lead, Pürkhauer. xxiv, 252; Roux. xxx, 299—yield fr. tin ore of Maine. xviii, 238—curious molecular disturbance. xxiii, 298—removed fr. tinned copper vessels, Böttger. xxv, 58—act. of trimethylamin on salts of tin, Vincent. xxv, 315—separation fr. antimony and arsenic, Clark. xix, 143—in Utah. xxi, 144.
- Tinned ware**, detect. of lead, Fordos. xxiii, 34.
- Tin plating** in the cold way, Zilken. xxx, 57.
- Tin scraps**, utilized, Bock. xviii, 239.
- Tin foil**, cont. lead, Wittstein. xxii, 48—does not contaminate, chocolate, soap, dry, candies, but cheese, Vogl. xix, 211—keeps out moisture, Boudinot. xix, 211.
- Tin, ARSENIDE**, Deschamps. xxvii, 367.
- PHOSPHIDE**, Natanson and Vortmann. xxvi, 404.
- PROTOCHLORIDE**, act. upon alkaloids, Godffroy. xxvi, 559—estimat. with ferric chlor., Pellet and Alart. xxvi, 403—best test for arsenic in mur. ac., Bettendorff. xix, 184.
- SULPHOCHROMITE**, Gräger. xxx, 297.
- Tincal**, California. xxvii, 587.
- Tinea zææ**, as destroyer of drugs, Saunders. xxi, 625.
- Tinctures**, recovering alcohol fr. residue, Lloyd. xxv, 109—analysis, method, Allen. xxviii, 80; of alkaloidal, Thresh. xxviii, 320—color comparison (spectroscope), Gilmour. xxvi, 85—drop equivalent, Talbot. xxix, 34—examin. of various, by Painter and others. xxv, 356, 7, 8, 9, 360, 1—estimat. of extractive matter, Eckels. xxviii, 82—amount of soluble matter, Laver. xxv, 108—stopper prevented fr. tightening by paraffin, Wilder. xxvi, 146.
- Tinctures** by DIALYSIS, Heebner. xxix, 100.
- ETHEREAL**, rapid evaporation by syphoning, Vulpius. xxii, 91.
- fr. FRESH and DRY plants, Lloyd. xxvi, 755, 899.
- MACERATION** as good as digestion, Dieterich. xxix, 100.
- UPWARD PERCOLATION**, Elborne. xxviii, 78.
- USE OF DEODORIZED PETROLEUM**, Masson. xxv, 270.
- TWENTY-FIVE PER CENT** strength, Davis. xxiv, 147.
- Tincture ACAROIDES**, Tully. xxx, 148.
- ACONITE**, examin. fr. various stores, Painter and others. xxv, 357, 8, 9, 360—prep. (acet. acid), Rother. xxi, 136.
- ALOES**, extract. matter, Eckels. xxviii, 82.
- ALOES COMP.**, King's C'y Medical Soc. xxvi, 149.
- ANGOSTURA AROMAT.**, Davidson. xxvi, 150.
- ARNICA**, amount of extract. matter, Laver. xxv, 109—prep., Boerner. xxx, 121; Moore. xxiv, 106; Rother. xxv, 109.
- AROMATICA**, Philadelphia Hospital. xxiv, 106.
- ASARUM CANADENSE**, Gorder. xxiv, 106.
- AURANTII CORT.**, examin. of various, Painter and others. xxv, 357, 8, 9, 360—(fresh peel) Barton. xxvii, 116; Gardner. xxviii, 443; Symes. xxi, 191.
- BENZOES COMP.**, Moore. xxx, 122.
- BOLDO**, Verne. xxiii, 101.
- CAFFEINA COMP.**, DRESDENSIS, Berg; Fingerhut. xxx, 122.
- CALABAR BEANS**, Ebert. xix, 162—Kennedy. xxiii, 604—Rother (acet. ac. xxi, 191).
- CALABAR BEANS, ETHEREAL**, cont. only traces of calabarin, Hager. xxvi, 150.
- CALADIUM SEGUINUM**, Scholz. xxvi, 150.
- CANNABIS INDICA**, hypodermic, Eutenberg. xxvii, 94.
- CANTHARIDES**, Kennedy. (strg. alc.) xxvi, 147—Rother (potassa). xxv, 109.
- CAPSICUM**, (strg. alc.) Kennedy. xxiv, 100—Rother (potassa). xxv, 109.
- CARDAMOM. CO** (syrup) Wilder. xxvi, 147—Wilson (glyc.) xxx, 121.
- CATECHU**, gelatinizat. prevented, Genois. xxv, 112—Moore. xxx, 121.
- CIMICIFUGA CONC.**, as paint in rheumatism, Close. xix, 488.
- CINCHONA**, amount of soluble matter, Laver. xxv, 109.
- CINCHONA COMP.**, Kennedy. xix, 162—examin. fr. various stores (fr. 2-10 to 4 p. c.) Robinson. xxv, 111. See also TINCT. HUXHAM.
- COCA**, Shuttleworth. xxiii, 101.
- COCHINEAL COMP.**, Hancock. xxi, 119.
- COLCHICUM ROOT**, extract. matter, Eckels. xxviii, 82.
- COLCHICUM SEED**, extract. matter, Eckels. xxviii, 82.
- COLOMBO**, amount of soluble matter, Laver. xxv, 109—best menstruum, Eberle. xxi, 594; Moore. xxv, 112.
- COTO**, Wittstein. xxiv, 107.
- CROCUS**, Wilder. xxiv, 107.
- CUBEBS**, examin. fr. various stores, Painter and others. xxv, 357, 8, 9, 360.
- CUPRI ACETATIS**, Rademacher, Rother. xxiii, 103.
- CURAÇAO CO.**, Gardner. xxviii, 443.
- DEERTONGUE**, Miller. xxiii, 102.
- DERMOPHYLLA** (tayuya) Ubicini. xxvi, 150.
- DIGITALIS**, examin. fr. various stores, Painter and others. xxv, 357, 8, 9, 360—amount of soluble matter, Laver. xxv, 109.
- DROSERA**, Vigier. xxvii, 226.
- ERGOT**, extract. matter, Eckels. xxviii, 82.
- EUCALYPTUS**, Lamatch. xxi, 190.
- FERRI ACET.**, Rother (acet. calc.) xxi, 192.
- FERRI ACET. ETHEREA**, Nietsch. xxix, 103.
- FERRI ACET., RADEMACHER**, Rother (citr. ac., chlor. pot.) xxiii, 103—Schlickum (acet. pot. or sod.) xxix, 103—Wellborn (citr. ac.) xxiii, 103.
- FERRI CHLORIDI**, adult. (water, acet. pot.) Rice. xxi, 500—contamin. with arsenic, Fletcher. xxix, 77—examin. of commercial, Diller.

Tincture. (*Continued.*)

- xxiv, 109, 416; Hoyt. xxiv, 109; Klie (as low as 5 gr. per ounce). xxviii, 85—act. in erysipelas, Benjamin. xxiv, 675—ethereal odor developed in the sun, Clark. xxiv, 108—prep., Rother; Shuttleworth (chlorate pot.) xxi, 192.
- **FERRI CHLORIDI**, TASTELESS, Remington. xxii, 93.
- **FERRI COMP.**, Philadelphia Hospital. xxiv, 106.
- **FERRI IODIDI**, Dutch Phar. Soc. xxx, 123.
- **FRANGULA REICHH.** xxiv, 107.
- **FRAXINI AMERICANÆ**, Edwards. xxx, 122.
- **GELSEMIUM**, Hancock. xxii, 342—fr. fresh root, Lloyd. xxvi, 755.
- **GENTIANA COMP.**, Baker. xxiii, 101.
- **GERANII MACULATI**, Lloyd. xxvi, 706.
- **GUAIACUM**, Williams. xxvi, 149.
- **GUAIAC. AMMON.**, Williams. xxvi, 149.
- **HUXHAM'S**. Wilder. xxiv, 107, see also **TINCT. CINCHON. CO.**
- **HYOSCYAMUS**, test for first and second years' leaves, Donovan. xxi, 623.
- **IODINE** turns blue by ozone. xxi, 272—examin. of commercial (fr. 8 to 36 grs. per fl. oz.; tinct. Rhatany), Rice. xxii, 316—for hypodermic solution, Powers. xxvii, 94—prep. (circulatory displacement), Cherry. xxviii, 85; (chloride sod.), Rother. xxv, 110.
- **IODINE DRACONAT.**, prep. (sulphite sod.), McCullough. xxi, 192; (ammonia better). xxv, 113; xxx, 122—activity due to iodoform. xxv, 113.
- **IODINE AND CHLORAL**, Pavesi. xxx, 123.
- **IODOFORM**, Keyworth. xxvii, 92.
- **IODOFORM COMP.**, Roe. xxvii, 116.
- **KINO**, gelatinization prevented (magnes. carb.), Connor. xxi, 190; (short maceration), Diehl. xxi, 190; (glyc.), Fox. xxv, 112; (logwood), Kennedy. xxviii, 84; (strg. alc.), Maisch. xxviii, 84; (boiling water, glyc.), Moore. xxix, 101; (add water to alcoh. tinct.), Rother. xxii, 91, 110—cause of gelatinization, Rother. xxviii, 83.
- **KINO COMP.**, Procter. xviii, 211.
- **KRAMERIA**, distinct. betw. diff. varieties, Flückiger. xxiv, 179—amount of soluble matter, Laver. xxv, 109.
- **LACTUCARIUM**, Lemberger. xxvi, 763.
- **LAMINARIA FLEXICAULIS**, Wheeler. xxx, 122.
- **LIATRIS ODORATA**, Miller. xxiii, 102.
- **LIMONIS**, fr. fresh peel, Barton. xxvii, 116—Gardner. xxviii, 443.
- **LOBELIA**, examin. fr. various stores, Painter and others. xxv, 357, 9, 360—amount of soluble matter, Laver. xxv, 109.
- **LUPULIN AMMON.** xxvi, 149.
- **MACROTYS** in rheumatism, Close. xix, 488.
- **MONNINIA**. xxvii, 218.
- **MYRRH**, examin. fr. various stores, Painter and others. xxv, 357, 8, 9, 360—residue for mucilage, Shuttleworth. xxi, 137.
- **NUX VOMICA**, examin. fr. various stores, Painter and others. xxv, 357, 8, 9, 360—prep. (acet. ac.), Rother. xxi, 136—strength depends upon fineness of powder, Siebold. xxv, 111.
- **OPIUM**, examin. fr. various stores (fr. 1 to 6 grs. per fl. oz.), Bacon. xxv, 361; Kennedy. xxii, 92, 317; Royce. xix, 447; Smith, Gates, Llewellyn. xxvi, 148—valuation, Prescott, Heim. xxvi, 823—extractive matter, Eckels. xxviii, 82 hypodermic sol., Powers. xxvii, 94—**PREPARATION**: (boiling water), Bond. xxi, 136; Moore. xxvi, 149; xxix, 101; Rother. xxv, 110; (neither powd. nor high temp. necessary), Mylius. xxix, 102; (keep in rooms of uniform temp.). xxi, 190—of Ph. Brit., real strength, Shuttleworth. xxiv, 181.
- **OPII AMMONIATA**, Ph. Brit., real strength, Shuttleworth. xxiv, 181.
- **OPII CAMPHORATA**, method of analysis, Allen. xxviii, 81—preparation: Berland (anise seed). xxix, 102; Fairthorne (extemporaneous). xxviii, 84; Moore (hot water). xxvi, 149; xxix, 102; Wheaton (extemp., magnesia), xviii, 211; Wilder (syrup). xxvi, 147—of Ph. Br., real strength, Shuttleworth. xxiv, 181.
- **OPII COMP.**, Hancock. xxii, 342.
- **OPII DEODORATA**, prep. Davis. xxv, 111; O'Donnell. xxiv, 489.

Tincture OPII MURIAT., Kennedy. xxiv, 107; Nichol. xxiv, 107.

- **PHOSPHORUS** (excess ought always to be present), Cowdrey. xxiii, 104.
- **PHYSOSTIGMA**, see **TINCT. CALABAR BEANS.**
- **PHYTOLACCA**, Hancock. xxii, 342.
- **PHYTOLACCA CONC.**, Hooper. xxv, 113.
- **PHYTOLACCA COMP.**, Hooper. xxv, 113.
- **PODOPHYLLIN**, Young and Postans. xxviii, 85.
- **PURGATIVE**, Dobell. xxix, 103.
- **QUEBRACHO**, Burgos. xxviii, 85.
- **QUEBRACHO, ALCOHOLIC and AQUEOUS**, Vulpus. xxviii, 84, 5.
- **QUEBRACHO COMP.**, Burgos. xxviii, 85.
- **QUILLAYA**, Grazer. xxx, 97—Phar. Soc. Paris. xxv, 112.
- **QUINIA**, Ph. Br., Martindale. xxvii, 116—Symes. xxi, 191.
- **QUINIA AMMON.**, Ph. Br., Brown. xxiv, 102—Curtis. xxv, 90—Ince. xxiii, 102; xxv, 90.
- **RHEI**, extract. matter, Eckels. xxviii, 82—examin. fr. various stores, Painter and others. xxv, 357, 8, 9, 360—preparation, Clarke (strg. alc.). xxix, 102; Moore (glyc.). xxii, 93; Rother (strg. alc.). xxi, 191.
- **RHEI COMP.**, examin. fr. various stores. xxv, 359.
- **RHEI DULCIS**, Procter, Jr. xviii, 211.
- **RUSCI**, Maisch. xxix, 102.
- **SANGUINARIA**, amount of soluble matter, Laver. xxv, 109.
- **SAPONIS VIRIDIS COMP.**, Tilbury Fox. xxi, 181.
- **SAPONIS VIRIDIS C. PICE**, Philadelphia Hospital. xxiv, 106.
- **STILLINGIA** (nitric ac.), Palmer. xxix, 103.
- **STYPTICA**, Philadelphia Hospital. xxiv, 106.
- **SUMBUL**. xxi, 122, *note*.
- **TANNIN**, IODATED, Boinet. xxii, 93.
- **TAYUYA**, Martin. xxiv, 185—Ubicini. xxvi, 150.
- **TOBACCO**, Eckels. xxviii, 82.
- **TOLU CONC.**, Moore. xxix, 102.
- **VALERIAN**, amount of soluble matter, Laver. xxv, 109—Patterson (glyc., magnes.). xxii, 93—examin. fr. various stores, Painter and others. xxv, 357, 8, 9, 360.
- **VERATRUM VIRIDE**, Lloyd. xxvi, 755.
- **VIEIRINA**. xxvii, 183.
- **VIOLET FLOWERS**, Bernbeck. xxvii, 112; xxix, 97.
- **WHITE ASH**, see **TINCT. FRAXIN. AMERICAN.**
- **ZINGIBER**, see also **ESSENCE GINGER**—amount of soluble matter, Laver. xxv, 109—examin. fr. various stores, Painter and others. xxv, 357, 8, 9, 360.
- Tinifer**—Pinus Cembra, France. xxvi, 322.
- Tinospora CORDIFOLIA**, India. xxiv, 724—Japan. xxviii, 186.
- Tipa**—Machærium fertile, Brazil. xxviii, 138.
- Tipoana SPECIOSA**, Brazil. xxviii, 138.
- Tippili malam**—Piper longum, India. xxviii, 191.
- Tissue, VESICATING**, D'ALBESPEYRE. xxii, 81.
- Titabli**—Dalbergia sympathetica, India. xxvi, 159.
- Titanium**. xxiv, 253—is analogous to silicium, Friedel and Guérin. xxiv, 253—prep., Kern. xxiv, 253.
- Titration** (Burette-holder fastened to shelving). xxix, 32—(format. of bichloride copper) Jean. xxiii, 110—acidimetric (haematoxylin) Maschke. xxiii, 111.
- Tlachichinoa** = Tournefortia mexicana, Mexico. xxiv, 772.
- Tlachichinolli** = Plumbago scandens, Mexico. xxiv, 772.
- Tlacopatle** = Aristolochia mexicana, Mexico. xxiv, 771.
- Toadflax**, see **CUSCUTA**;—**T. BASTARD**, = Comandra umbellata, Kansas. xxix, 451.
- Tobacco**, analysis of ash of Havana cigars, Smith. xxii, 107—of "Virginia," Mallet. xxiii, 150—sassafras an antidote, Lyle. xxv, 131—cultivat. in Kentucky. xxvii, 158; McGill. xxviii, 123; Ohio, Creighton. xxiv, 132; Pennsylvania, Wittmer. xxiv, 132; Virginia, Miller. xxvii, 157—"fatty" is rich in nicotin, Kissling. xxx, 168—estimat. of nicotin, Pease. xxix, 139; Skalweit. xxx, 165; Schloessing. xxx, 166.
- **SMOKERS** deodorized by thymol. xxx, 69.

- Tobacco bush = *Hedyosmum nutans*, Jamaica. xxx, 153.
- "Tobacco of the desert" = a spec. of *Hyoscyamus*, Algeria. xxv, 228.
- Tobocora (of "Pomet"). xxvi, 845.
- Toddalia ACULRATA, Mauritius. xxiv, 741.
- To-kee (ki) = *Ligusticum acutilobum*, Japan. xxviii, 160.
- Tokiwa = *Eulalia Japonica*, Japan. xxviii, 104.
- Tokoro = *Dioscorea quinqueloba*, Japan. xxviii, 111.
- Tokusa = *Alisma plantago*, Japan. xxviii, 105.
- Tola, Arg. Republ. xxiv, 763.
- Tollou = *Heteromeles arbutifolia*, California. xxx, 138.
- Tolu, see BALS. TOLU.
- Toluen, act. of heated platinum and palladium coil. xxii, 208—prop., Rosenstiehl. xxii, 211.
- Toluol, act. of ozone, Mailfert. xxx, 259.
- Tolu-qu(ch)inon, Fittig. xxii, 276—prep., Nietzki. xxvii, 524.
- Tomatilla, Arg. Republ. xxiv, 762.
- Tomato, cont. solania, Kennedy. xxi, 214—uses in Orient, Landerer. xxiv, 132.
- Tomatophyllum REFLEXUM, Mauritius. xxiv, 741.
- Tomillo, Arg. Republ. xxiv, 762.
- Tomo-roki = *Asparagus lucidus*, Japan. xxviii, 109.
- Tong-Pang-chong = *Rhinacanthus communis*, China. xxvii, 157.
- Tonga, Fiji islands, Gerrard. xxviii, 199—botanical source, Holmes; Brown. xxx, 146, 7—*Raphidophora vitiensis*, Holmes. xxviii, 199—uses in neuralgia, Ringer and Murrel. xxviii, 199—*Sambucus nigra*, Japan. xxviii, 158.
- Tongöl = *Muscari (?) comosum*, Albania. xxix, 125.
- Tonka (bean). xxvi, 293—drug market. xix, 402; xx, 121; xxi, 434; xxii, 622; xxiv, 394; xxvi, 654; xxvii, 557, 560; xxviii, 374; xxx, 472.
- Too = *Amygdalus persica*, Japan. xxviii, 179.
- Too-hange = *Pinellia tuberifera*, Japan. xxviii, 102.
- Took-chang-youk = oil of peppermint, China. xxviii, 266.
- Toothache (nitr. eth.) xviii, 203; (pyrethrum). xix, 488; (carbol. ac., chloral). xxiii, 116; (chlorof.; peppermint; creosote). xxiii, 116; xxiv, 112; (nitrite amyl; nitro glyc.) xxx, 132.
- Tooth powders, Wiegand. xxiii, 116—coloring, Fairthorne. xxix, 111; (expressed oil almonds) Enderlin. xxi, 179; Wollenweber. xxi, 180.
- Hogan. xxv, 96; Suerssen. xxviii, 92; Avery. xxvii, 124. See also DENTIFRICE.
- Tooth wash, Runyon. xxx, 131—(quillaya) Bennett. xxix, 111—(alcohol best) Suerssen. xxviii, 92.
- Topaisaire, Arg. Republ. xxiv, 762, 3; xxx, 138.
- Toppi = *Phyllanthus emblica*, India. xxviii, 194.
- Torche = Galipot, France. xxvi, 324.
- Torksal = *Catha edulis*, Abyssinia. xix, 270.
- Tormentilla, loss in drying. xxi, 203.
- Tornillo, Arg. Republ. xxiv, 762.
- Toronjil, Arg. Republ. xxiv, 763—*Cedronella mexicana*, Mexico. xxiv, 772.
- Torreya CALIFORNICA. xix, 306; xxvii, 602.
- To-sai-shin = *Asarum Sieboldii*, Japan. xxviii, 116.
- Toucan's tongue = a curare plant, Brazil. xxvi, 216.
- Touch-me-not = *Impatiens fulva*, Kansas. xxix, 445.
- Tous-les-mois, Bermuda, history, cultivat., etc. xxiv, 740.
- Tournefortia MEXICANA, Mexico. xxiv, 772.
- Toussa = *Monodora grandiflora*, Africa. xxix, 115.
- Towai = *Weinmannia racemosa*, New Zealand. xxiv, 737; xxv, 365.
- Toxiresin, in digitalis, Schmiedeberg. xxiii, 445.
- To-yak(yaku) = *Pleurogyne rotata*, Japan. xxviii, 135.
- Toyoyu = *Heteromeles arbutifolia*, California; xxx, 138.
- Trachylobium spec., yield copal, Africa. xxiii, 229.
- Trademarks. xxx, 641.
- Tradescantia VIRGINICA, Kansas. xxix, 441.
- Tragacanth, adult. of powd. xxx, 577—drug market. xxii, 625; xxiv, 396; xxv, 349; xxvi, 655; xxx, 467—comparat. examin. of 24 varieties, Masing. xxix, 214—cont. pectose, Girard. xxiii, 361—quick mucilage. xix, 149; xxi, 174—varieties, Stöckel. xxi, 254.
- Traganton. examinat., Masing. xxix, 214.
- Tramontana, Arg. Republ. xxiv, 761, 3.
- Trapa BISPINOSA, India. xxiv, 725.
- Trash = Withered poppy leaves, for opium wrappers, India. xxiv, 727.
- Trayamana = a spec. of *Delphinium*, India. xxvi, 161.
- Treasurer, increase of salary, Squibb. xxi, 95; xxv, 545.
- xviii, 7; xix, 9; xx, 9; xxi, 9; xxii, 9; xxiii, 9; xxiv, 9; xxv, 8; xxvi, 8; xxvii, 8; xxviii, 8; xxix, 10; xxx, 8.
- Trehalose, in *æthaliu septicum* and *Mucor mucedo*, Muntz. xxiii, 122.
- Tres folhas Vermelhas = *Esenbeckia febrifuga*, Brazil. xxiii, 190.
- Trianosperma TAYUYA, Brazil. xxiii, 121; xxiv, 184.
- Tribulus LANUGINOSUS, India. xxiv, 725;—T. TERRESTRIS, China. xxiv, 751.
- Tribromcumol, Engler. xxviii, 259.
- Tribromocotoin, Jobst and Hesse. xxviii, 201.
- Tricerastes GLOMERATA, Calif. xxvii, 608.
- Trichloracetal. xxvi, 474.
- Tricholepis PROCUMBENS, India, descript., Dymock. xxviii, 149.
- Trichosanthos CORDATA, India. xxv, 201;—T. CUCUMERINA, India, descript., Dymock. xxv, 201;—T. DIOICA, China. xxiv, 749;—T. PALMATA, India, descript., Dymock. xxv, 201.
- Trichostemma LANATUM, Mexico. xxvii, 163.
- Tricodeina. xxii, 266.
- Tri-ethyl-alcamin, Ladenburg. xxx, 399.
- Trifolia = *Naregamia alata*, India (Goa). xxvi, 158.
- FIBRINA, loss in drying. xxi, 202;—T. PRATENSIS, Calif. xxvii, 608; Kansas. xxix, 447;—T. REFLEXUM, Kansas. xxix, 447;—T. REPENS, Calif. xxvii, 608; Kansas. xxix, 447;—T. TRIDENTATUM, Calif. xxvii, 608.
- Trigonella FÆNUMGRÆCUM, Turkestan. xxi, 256.
- Trigonochlamys GRIFFITHII, India. xxiv, 196.
- Tri-iodaldehyde, see IODAL.
- Trillium OVATUM;—T. SESSILE, Calif. xix, 307.
- Trimethylamin, see also PROPYLAMIN—chemical history, Spencer. xxiii, 433—comp. of commercial, Duvillier and Buisine. xxviii, 343—for producing artif. ice, Tellier. xxvii, 291—fr. beetroot molasses, Vincent. xxv, 315—in manufact. of potash. xxviii, 233—fr. skate (*Raja batis*), Groves. xxiii, 433.
- MIXTURE, Spencer. xxiii, 81.
- Trimethyl-ETHYLEN. xxvii, 414.
- GLYCERAMIN, Hanriot. xxvii, 525.
- OXÆTHYLAMMONIUM - HYDROXIDE = neurin. xxvi, 611.
- VINYLAMMONIUM-HYDROXIDE = neurin. xxvi, 611.
- Trinitrocellulose, Wolfram. xxvii, 437.
- Trinkerit, analysis, Hlasiwetz. xix, 310.
- Triomma MALLACENSIS, India. xxiv, 195.
- Triosteum PERFOLIATUM, Kansas. xxix, 441.
- Trioxybenzol. xxvii, 436.
- Tripa de Judas = *Cissus tiliacea*, Mexico. xxiv, 777.
- Triphloretid, Schiff. xxiii, 440.
- Tripolith, uses. xxix, 375.
- Tristemma VIRUSAMUM, Mauritius. xxiv, 741.
- Triticin in *Triticum repens*, Müller. xxii, 99, 246.
- Triticum HIBERNUM*. xxix, 121.
- REPENS, analysis, Ludwig and Müller. xxi, 205; xxii, 99; Planchud. xxvi, 180—its ergot, Wilson. xxiv, 120—in Arg. Republ. xxiv, 764.
- SATIVUM, ergot, Wilson. xxiv, 120.
- Trixis PIPITZAHUAC, Mexico. xxiv, 775.
- Trochisci, see LOZENGES.
- Trommadorff, exhibit., (Cent. exhib.) xxiv, 792.
- Trompatilla = *Bouvardia triphylla*, Mexico. xxii, 120.
- Tropæolin "D" = Methyl orange. xxx, 443—as indicator, Miller. xxvi, 375.
- Tropæolum MAJUS, constitut. of oil, Hoffmann. xxii, 222.

- Tropeine, Power.** xxx, 424.
 — **COMPOUNDS**, Ladenburg. xxix, 337.
 — **OXYTOLUYL-** (homatropin), Ladenburg. xxviii, 321.
 — **SALICYL-**, Ladenburg. xxviii, 321.
Tropia, fr. belladonna, Buchheim. xxv, 308.
 — **AMYGDALATE**. xxx, 424.
 — **PLATINO-CHLORIDE**. xxix, 335.
Tropidin, fr. tropia, Ladenburg. xxviii, 334—relation to collidin and coniin, Ladenburg. xxviii, 334.
Trypsin and **Papaïn** agree closely in action, Wurtz. xxix, 367.
Tsaou-woo—*Aconitum japonicum*, China. xxix, 170.
Ts'au-wee-t'u—a spec. of aconite, China. xxix, 173.
Tcharim dorö—a spec. of tangle, Turkestan. xxi, 203.
Tschub-i-tschini gulabi—root of *Smilax china*, Turkestan. xxii, 100.
Tschuking—*Ubyaea Schimperii*, Abyssinia. xxvi, 228.
Tsch-tsze = a spec. of aconite, China. xxix, 173.
Tsikube = *Eulalia japonica*, Japan. xxviii, 104.
Tsi-ku-setz nin-jin—*Aralia edulis*, Japan. xxviii, 161.
Tsikusitz—*Eulalia japonica*, Japan. xxviii, 104.
Tsinisse = corms of *Asphodelus bulbosus*, Turkey. xxx, 151.
Tsubanna—*Saccharum spicatum*, Japan. xxviii, 105.
Tsuknida—*Urtica pilulifera*, Greece. xxx, 246.
Tuberoze, cultivat. in France. xxiv, 823; xxvii, 382.
Tubocuty—*Abutilon indicum*, India. xxvi, 162.
Tuchmach = *Sophora japonica*, Turkestan. xxi, 211.
Tuchmi reihau—*Ocimum basilicum*, Turkestan. xxi, 221.
Tufts, Chs. A. see also **TREASURER**.
 — discussions. xviii, 47, 109, 110; xix, 109, 110, 111, 120, 125, 126; xxi, 33; xxiii, 796, 830; xxv, 528; xxvi, 910; xxviii, 561.
Tukali—*Sida acuta*, India. xxv, 182.
Tukm-i-khitmi—seeds of *Althaea officinalis*, Persia. xxvi, 162.
Tukm-i-pan-jangusht (Persian)—fruit of a spec. of *Vitex*, India. xxviii, 126.
Tukmi rihan—seeds of *Ocimum pilosum*, Persia. xxvi, 159.
Tumbi = fruit of *Lagenaria vulgaris* var. *amara*, India. xxvii, 230.
Tungsten. xix, 219; xxi, 308; xxiii, 298; xxv, 254, 262; xxvii, 357; xxx, 301.
 — act. of mur. ac. and sulphocy. pot., Mallet. xxiv, 254—color reactions, Mallet. xxiv, 254, 5—improves iron, Biermann. xxvii, 357—fr. Wolfram, Jean. xxiv, 254—tests, Mallet. xxiii, 298.
Tungstoborates, (11) Klein. xxx, 300, 1.
Tunicin, animal cellulose fr. mollusks of Tunis, Berthelot. xxi, 351—constitution, Franchimont. xxviii, 294.
Tunita—*Cinchona lancifolia* var. *vera*, New Granada. xxiii, 400.
Tupé, Arg. Republ. xxiv, 762.
Tupelo—*Nyssa aquatica* and *N. biflora*, Carolinas. xxvii, 146.
Turbith, **NITRATE**, see **MERCURY**, **NITRATE**, **BIBASIC**.
Turbuz(buz) = seeds of *Citrullus vulgaris*, India. xxvii, 229.
Turiones pini, loss in drying. xxi, 203.
Turkestan, drugs, Dragendorff. xxi, 201.
Turkey, chemicals, Cent. exhibit. xxiv, 800—pharm. prep. xxiv, 813.
Turmeric, coloring power, Küpfer. xxiv, 382—cultivat., India. xxiv, 720; Jamaica. xxiv, 736—extracted (bisulph. carbon; ether), Gajewsky. xix, 294—fluorescent in castor oil, Horner. xxiii, 461—detect. in powd. rhubarb, Howie. xxii, 311.
Turnera APHRODISIACA, California. xxvii, 608; xxix, 206—descript., Urban. xxx, 235. See also **DAMIANA**.
Turnera DIFFUSA, descript., Urban. xxx, 235;—**T. MICROPHYLLA**, descript., Holmes. xxiv, 186, 7; xxix, 206.
Turneraceæ. xxiv, 185; xxix, 206; xxx, 235.
Turpentine, CRUDE. xxvi, 316—composition. xxvi, 320—source, extraction, etc., Morel. xxvi, 316, 8, 320—is a hydride of cymen, Bruylants. xxvi, 466.
 — **COLLECTION** in the Black Forest, Flückiger. xxii, 163—in Bernese Jura, Flückiger. xxiv, 204—in France, Petzoldt. xxiv, 203; Morel. xxvi, 318—in Florida, Georgia, Zacharias. xxvi, 326—in North Carolina, Wood. xxix, 235.
 — fr. **ALEPPO PINE**. xxvi, 323;—**T. AMERICAN**. xxvi, 320;—**T. BORDEAUX**. xxvi, 320;—**T. CANADA**. xxvi, 314.
 — **CHIAN**, descript., Jansen; Kelley. xxix, 224—account and prop., Martindale and Modler. xxviii, 188, 9—fr. *Pistacia terebinthus*, Landerer. xxvi, 296—probably fr. other parts of Greece, Landerer. xxix, 223—might probably be collected in Algeria, Flückiger. xxix, 223—collect. in Chios, Stiepowich. xxix, 222—therapeut. value, Clay. xxix, 225.
 — **GERMAN**. xxvi, 320;—**T. LARCH**. xxvi, 321.
 — **STRASSBURG**, analysis, Rochleder, Flückiger, Caillot. xxvi, 314—collection, Morel. xxvi, 313; xxvii, 279.
 — **VENICE**, composition, Unverdorben. xxvi, 322—account, etc., Morel. xxvi, 321.
 — **VIRGIN**. xxix, 235;—**T. YELLOW DIP**. xxix, 235.
Turpentine root—*Wyethia helenoides*, California. xxvi, 698.
Turritis PERFOLIATA, Calif. xix, 299.
Turwar—*Cassia auriculata*, India. xxv, 211.
Tusa—*Misodendron macrophyllum*, Chili. xxiv, 765.
Tutu—*Coriaria ruscifolia*, New Zealand. xxiv, 737.
Tuvvah—*Rubia tinctorum* xxvii, 181.
Twitchell, D. S. (Kansas City) address of welcome. xxix, 478.
Typha ANGUSTIFOLIA, Japan;—**T. BUNGBANA**, China;—**T. JAPONICA**, Japan, descript., Holmes. xxviii, 103;—**T. LATIFOLIA**, Kansas. xxix, 451.
Typhaceæ. xxviii, 103; Kansas. xxix, 451.
Tylophora ASTHMATICA, substitute for ipecac, India. xxiv, 139, 725.
Tyrosin, in potato, Schulze and Barbieri. xxviii, 120—in rhatany, Wittstein. xxiii, 60.
- U.**
- Ubyaea SCHIMPERI**, Abyssinia. xxvii, 176—analysis of flower heads, Dragendorff. xxvi, 228.
Uchacachi (quinoa). South America. xxi, 213.
Udeojati—*Justicia ecboium*, India. xxviii, 125.
Udo—*Aralia edulis*, Japan. xxviii, 161.
Ulexite, California. xxvii, 586.
Ulmus AMERICANA, Kansas. xxix, 452.
 — **CAMPESTRIS**, analysis of ash of flowers, Church. xxv, 227; young leaves and buds cont. a ferment, Kosmann. xxv, 30, 330.
 — **FULVA**, Kansas. xxix, 452.
Ultee—a spec. of *Hibiscus*, India, descript., Dymock. xxvi, 159.
Ultramarin, artificial, priority, Guimet. xxviii, 240—history, Gendin. xxvii, 340—(BROWN, GREEN, BLUE, VIOLET, RED, WHITE), Plicquet. xxvii, 339.
 — **METALLIC**, Plicquet. xxvii, 340.
Ultra-quinine in Cuprea, Whiffen. xxx, 203.
Umbellaria CALIFORNICA. xxviii, 264.
Umbelliferae. xviii, 287; xix, 276; xxi, 230; xxii, 134; xxiii, 177; xxiv, 153; xxv, 168; xxvi, 247; xxvii, 192; xxviii, 159; xxix, 167. xxx, 201; of California. xix, 301; Kansas. xxix, 452.
Umbellol, Stillman. xxviii, 264.
Ume—*Amygdalus nana*, Japan. xxviii, 179.
Umebos—*Amygdalus nana*, Japan. xxviii, 179.
Umma busuki—*Arcium lappa*, Japan. xxviii, 145.
Uncaria ACIDA, India. xxviii, 157;—**U. GAMBIER**, Japan, descript., Holmes. xxviii, 157—contains 3 distinct catechins, Gautier. xxvi, 558.
Unguentum, see **OINTMENT**.
Unicorn root, adul. of powd. xxx, 577—use by the Indians. xxi, 619.

- Unmatta**—*Datura alba* and *D. fastuosa*, India. xxviii, 123.
- Unnab**—fruit of a spec. of *Zizyphus*, India. xxvi, 166.
- Unona ODORATISSIMA**, Philippines. xix, 308; xxii, 127; xxix, 189. see also **YHLANG**.
- Untamool**—*Tylophora asthmatica*, India. xxiv, 725.
- Unzeroot** (Arabic)—*Sarcocolla*, India. xxvii, 248.
- Upas tree**, see **ANTIARIS TOXICARIA**.
- Uralium**, Guyard. xxviii, 256.
- Uranium**. xxi, 301; xxiii, 293; xxiv, 248; xxix, 265.
- **OXIDE**, formed by act. of peroxide hydrogen on salts, Fairley. xxiv, 248—production at Joachimsthal, Lallemand. xxix, 265—recovered from phosph. ac. determinations, Reichardt. xxiii, 293—act. of trimethylamin, Vincent. xxv, 315—test, Kern. xxiv, 249.
- **AMIDOSULPHONATE**, Berglund. xxvii, 332.
- **CHLORIDE**, Follenius. xxi, 301.
- **PENTACHLORIDE**, Roscoe. xxiii, 294.
- **SUCCINATE**, Lupton. xxiv, 327.
- **TUNGSTOBORATE**, Klein. xxx, 302.
- Uraré(ri)**, see **CURARE**.
- Urari uva**—*Strychnos Castelnazi*, Brazil. xxvi, 216.
- Uraspermum CLAYTONII**, xxx, 209.
- Urceolaria** of ancient writers—*Parietaria officinalis*, Landerer. xxv, 122.
- Urea**, act. of hypochlorites of soda and lime, Yvon. xxvi, 643—**ESTIMATION**: Apjohn. xxiii, 470; Arnold. xxx, 438; Blackley. xxv, 332; Depaire. xxvi, 640; Dupré. xxvi, 637; Esbach. xxv, 331; Fowler. xxvi, 636; Simpson and O'Keefe. xxvi, 638—**estimat.** in blood, deserves little confidence, Fekelharing. xxiv, 392; in blood, Yvon. xxvi, 642—**preparation fr. urine**, Loughlin. xxiii, 470—**SYNTHESIS**: Bell (ferroc. pot.). xxiv, 391; Herroun (benzene and ammonia). xxx, 437.
- **TEST PAPER**, Musculus. xxiii, 472.
- **SILVER**-, Mulder. xxii, 290.
- Ureometer**, see **UREA, ESTIMATION**.
- Urgevão**—*Stachytarpheta jamaicensis*, Brazil. xxii, 163.
- Urine**, detect. of **ALBUMEN**: Bodeker (ferroc. pot.). xxix, 358; Galippe (picric ac.). xxiv, 389; Heinsius (dialysis). xxiv, 387; Hilger (acet. ac., ferroc. pot.), Hilger. xxiii, 473; Ilimow, (carbolic ac.). xxviii, 357; Raabe (trichloracet. ac.). xxx, 449; Stobnikow (nitric ac.). xxv, 322—**detect.** of **ALCOHOL** (urine must be distilled, else all tests will be fallacious), Hewett. xxv, 275—**detect.** of **BILE**: Cunisset., (chlorof.) xix, 234; Hilger (Hoppe-Seiler). xxii, 474; Rosenbach (filtering paper; nitr. ac.). xxiv, 392; Smith (iodine; ferric chlor.; peroxide hydrog.). xxvi, 644—**estimat.** of **CARBOLIC AC.**, Cloëtta and Schaer. xxx, 352; Dragendorff. xxvi, 634—**detect.** of **CHLOROPHORM** (by Fehling's solut. is unreliable), Reichardt. xxvii, 546—**cont.** cryptophanic ac., Thudichum. xix, 235—“(C₃H₈N₂O)” Baumstark. xxii, 290—**diabetic cont.** **DEXTRIN**, Reichardt. xxiii, 473—**estimat.** of **GLUCOSE**: Battandier, (Fehling with ammon.). xxix, 310; Brücke (modified, Böttger) xxvi, 634; Caillan (chlorof.). xxvii, 547; Campani (acet. lead and copper). xxi, 355—Kütz; Wittstein (precautions). xxvi, 633; (ought to be decolorized first). xxii, 248—**glucose** is a normal constituent in old persons, Hager. xxvi, 633—**estimat.** of **INDICAN**, Weber. xxvii, 546—**detect.** of **MERCURY**, Fürbringer. xxvii, 547; Merget. xxx, 305—**estimat.** of free **OXYGEN**, Freire. xxiv, 391—**preserved** by perchlor. iron, Almés. xxiv, 244—**detect.** of **QUININE**, Vitali. xxiii, 413—**detect.** of **SALICYLIC AC.**, Sieboldt; Bradbury. xxx, 388—**estimat.** of **SULPH. AC.**, Bauman. xxvi, 634—**detect.** of **TYROSIN** and **leucin**, Frerichs. xxvi, 635—**TEST** in potable water, Leffmann. xxx, 309.
- Urine**, uses in China. xxiv, 250, 765.
- Urinometer**, see **UREA, ESTIMATION**.
- Urnattai**—*Datura alba* and *D. fastuosa*, India. xxviii, 123.
- Uro amisi**—*Patricia scabiosaefolia*, Japan. xxviii, 150.
- Uroscop**, pocket case (caustic-holder size) Yvon. xxv, 333.
- Urtica dioica**, Kansas. xxix, 452;—**U. GRACILIS**, California. xix, 306;—**U. MEXICANA**, Mexico. xxiv, 770;—**U. PILULIFERA**, Greece. xxx, 245; **U. TUBEROSA**, Japan, descript., Holmes. xxviii, 196; **U. URENS**, Kansas. xxix, 452.
- Urticaceæ**. xix, 293; xxi, 267; xxii, 160; xxiii, 224; xxiv, 203; xxv, 227; xxvi, 306; xxvii, 267; xxviii, 196; xxix, 234; xxx, 251; of California. xix, 306; Kansas. xxix, 452; Mexico. xxiv, 770.
- Uruguay**, pharmacy, Wheeler. xxiv, 446.
- Urzella**—*Lichen orcella*, India. xxiii, 213.
- Usburg**—a spec. of *Delphinium*, India. xxiv, 718.
- Usillo de la sierra**, Arg. Republ. xxiv, 762, 3.
- Usneh**—*Parlia perlata*, India. xxiv, 718.
- Ustilago MAÏDIS**, constituents, Hahn. xxx, 144—**therapeut. value**, Leonard. xxv, 27, 119.
- Utaku**—a spec. of *aconite*, Japan. xxix, 173.
- Utangan**—seed of *Acanthodium spicatum*, India. xxviii, 124.
- Utees**—*Aconitum heterophyllum*. xxvii, 198.
- Utinjan**—seeds of *Acanthodium spicatum*, India. xxviii, 124.
- Uvas de ruda**, Arg. Republ. xxiv, 762.
- Uva ursi**, adult. of powd., xxx, 577—eighty years ago. xxvi, 848.
- Uvaria ODORATA** (Yhlang), Philippine islands. xxix, 189;—**U. TOMENTOSA**, examin. of gum, Masing. xxix, 214.
- Uvularia CIRRHOSA**, Japan. xxviii, 110.
- Uzu**—a spec. of *aconite*, Japan. xxix, 173.

V.

- Vaccine virus**, preserved by glyc., Müller. xxii, 290.
- Vaccinium MACROCARPUM**, see **CRANBERRIES**;—**V. MYRTILLUS**, see **HUCKLEBERRIES**;—**V. OVATUM**;—**V. PARVIFOLIUM**. California. xix, 303.
- **VITIS IDÆI**, as source of citric ac.; cont. also malic ac., Gräger. xxii, 114, 255; Mylius. xxx, 111—**berries cont.** benzoin ac., Læw. xxviii, 307—**crystallizable principle**, Claassen. xviii, 279.
- Vacuum apparatus** for laboratories, Hanks. xxvi, 59—still, Lenz. xxvi, 74.
- Vahona**—*Aloe sahundra*, Madagascar. xxx, 150.
- Vaivarna**—*Crataeva religiosa*, India. xxv, 194.
- Valentinite**, California. xxvii, 585.
- Valeriana CELTICA**, Austria. xxii, 166;—**V. MEXICANA**, Mexico. xxiv, 775.
- Valerian** (**OFFICINALIS**), adult of powd. xxx, 577; root of *Sium longifolium*, Bernbeck. xxix, 161—**contamin.** with *Veratrum album*, Bentley. xxv, 162—**description**, Holmes. xxvii, 217—**germinat.** of seed, Saunders. xxx, 567.
- , Turkestan. xxii, 120.
- Valerianaceæ**. xxii, 120; xxv, 162; xxvii, 180; xxviii, 150; xxix, 161; Mexico. xxiv, 775.
- Valerylène**, act. of hypochlorous ac., Haubst. xxiv, 271.
- Valonia**, fr *Quercus ægilops*. xxvi, 312.
- Valum birikai**—fruit of *Helicteris Isora*, India. xxvi, 165.
- Vanadium**. xxii, 201; xxvi, 405;—fr. bohn-iron ore, Böttger. xxii, 201.
- **SULPHATE**, in analysis, Gerland. xxvi, 406.
- **TETROXIDE**, in analysis, Gerland. xxvi, 406.
- Vanilla** and **asafoetida** are linked together, Tiemann. xxiv, 382—**collection**. xxiii, 138; according to “Pomet.” xxiii, 140—**drug market**. xix, 402; xx, 121; xxi, 434; xxii, 622; xxiv, 394; xxvi, 654; xxvii, 557, 560; xxix, 375; xxx, 472—**origin** of commercial varieties, xxiii, 138, 9; Sawyer. xxix, 130—**estimat.** of vanillin, Tiemann and Haarmann. xxiv, 127, 8; xxviii, 348.
- **cultiv.** in Jamaica. xxiv, 735.
- **AROMATICA** (the least aromatic), Brazil and Peru. xxiii, 138, 9; xxix, 130;—**V. BASURA**. xxiii, 138;—**V. CHICA PRIMA**. xxiii, 138;—**V. CIGARMAKERS'**—*Critonea Dalea*, Jamaica. xxx, 153—**V. CLAVICULATA**. xxix, 130;—**V. GUIANENSIS**. xxiii, 139; xxix, 130;—**V. PALMARUM**, Bahia. xxiii, 139; xxix, 130;—**V. PLANIFOLIA**. Mexico. xxiii, 138; xxix, 130;—**V. POMONA**, Mexico. xxiii, 139;—**V. PRIMIERA**. xxiii, 138;—**V. SACATA**. xxiii, 138;—**V. SATIVA**, Mexico. xxiii, 139; xxix, 130;—**V. SOUTHERN**, see **LIATRIS ODORATISSIMA**;—**V. SYLVESTRIS**, Mexico. xxiii,

Vanilla. (Continued.)

- 139; xxix, 130;—*V. VESICATA*. xxiii, 138;—*V. VIRIDIFOLIA*. xxix, 130;—*V. WILD*, see *LIATRIS ODORATISSIMA*;—*V. WILD*, of *ECUADOR*. xxii, 312.
- Vanillin**, artificial is not poisonous, Wolff. xxviii, 348—in benzoës, Rump. xxvii, 531—prep. fr. *coniferum*, Tiemann and Haarmann. xxii, 282; xxiii, 449; xxiv, 789—is mono-methyl proto-catecholic aldehyd. xxvi, 620—its relation to vanilla bean, Rump. xxvi, 619—estimat., Haarmann and Reimer. xxiv, 127, 8; xxviii, 348.
- of Goble and Vee is vanillic ac., Stokkebye. xxi, 366.
- Vanillin**, fr. *NARCOTINA*, Wright and Beckett. xxvi, 564;—fr. *OATHRAN*, Serrulus. xxvii, 531;—fr. *OIL CLOVES*, Tiemann. xxvi, 620; xxx, 444—starting fr. *CARBOLATE SODIUM*, Tiemann. xxiv, 381—in crude SUGARS, Lippmann. xxviii, 348.
- **POWDER**, for flavor, Hager. xxiv, 382.
- **coumarin**, Tiemann. xxiv, 382.
- Vanillon**—*Vanilla pompona*, Mexico. xxix, 130.
- Vapor condenser**, Hager. xxv, 52.
- *PINI PUMILIONIS*;—*V. PINI SYLVESTRIS*. xxvi, 151.
- Vara mulli**—*Barleria prionitis*, India. xxviii, 124.
- Varnish**, *AQUEOUS*, Eder. xxix, 56;—*V. for BRONZING*. xxviii, 98;—*V. CAOUTCHOUC*, Eder. xxx, 135;—*V. CARBOLIC*. xxviii, 97;—*V. COPAL*, Schwarz. xxvii, 208;—*V. for DRAWINGS*, maps, etc. xxx, 136;—*V. LEATHER*, black, Henning. xxvii, 126; *Valta*. xxx, 135;—*V. LABEL*, see *LABEL*, *VARNISH*;—*V. to replace PAINT*, Theis. xxviii, 97;—*V. for PAPER*. xix, 174;—*V. for PICTURES and PLANTS*. xix, 174;—*V. for PHOTOGRAPHERS*. xxiv, 113;—*V. ANTI-RUST*. xix, 175; *V. SHELLAC*, clarified, Peltz. xxiii, 226;—*V. WAX*, Koch. xix, 175.
- Vaseline**, see also *COSMOLINE* and *OINTMENT*, *PETROLEUM*.
- account, Moss and Gerrard. xxiv, 271—act. of bromine, Allen. xxx, 314—rancidity, Markoe; Remington. xxv, 522.
- Vateria INDICA**, India. xxiv, 718.
- Vaucheria TERRESTRIS** cont. characin, Phipson. xxviii, 268.
- Vauvan**—*Laurelia serrata*, Chili. xxiv, 765.
- Veckale**—*Conocarpus latifolia*, India. xxiv, 718.
- Vegetation**, act. of zinc, Freitag. xix, 207.
- Vekhand**—a spec. of *calamus*, India. xxix, 118.
- Velai gum**—fr. *Acacia odoratissima* and *A. leucophloea*, India. xxiv, 718.
- Velvet leaf** = *Abutilon Avicenna*, Kansas. xxix, 448.
- Venetian rouge**, Kidder's, analysis, Risser. xxiv, 420.
- Vengay gum**—fr. *Pterocarpus marsupium*, India. xxiv, 718.
- Ventilago MADERASPATANA**, India. xxiv, 716.
- Veratralbia**, prep., Mitchell. xxii, 412, 5—physiolog. act., Mitchell. xxii, 420, 5.
- Veratramarin**, Weppen. xxi, 206.
- Veratria**, act. of ferric chlor., butter antimony, stannous chlor., Godeffroy. xxvi, 559; of bi-chromate mixt., chlorin. lime, Hamlin, Jr. xxix, 325; of sulph. ac. and sugar, Hamlin, Jr. xxix, 325; of sulphomolybdate ammon., Buckingham. xxi, 369; act. of zinc chlor., Jorisson. xxix, 267—constitution, Weigelin and Tobien. xxvi, 593; Schmidt and Köppen. xxv, 310—fluid volume, Candidus. xxvii, 709—hypodermic solut., Powers. xxvii, 94—preparation: Alessandri (oxalic acid). xxx, 430; Boiraux and Leger (coal oil). xxiii, 423—prep. and prop., Mitchell. xxii, 415, 7; fr. roots of *Veratrum viride*, Wormley. xxiv, 356, 8—Wright and Luff. xxvi, 594.
- (of Scattergood) is *jervia* and resin, Bullock. xxiv, 363.
- solubility in alc., Lafean. xxix, 324; in chloral hydrate, Fairthorne. xxiii, 345; in glycerin, Farley. xxviii, 285; in fixed oils by glac. acet. ac., Barnes. xxiv, 343—spectrum, Meyer. xxvii, 479, 482—test, Schneider, Weppen. xxiii, 424.
- Veratria** with *BILIARY ACIDS*, del'Arbre. xxi, 371.
- **PERIODATE**, Bauer. xxiii, 425.

- Veratria**, *TRI-IODIDE*, Bauer. xxiii, 425.
- Veratridia**, prop., Robbins. xxv, 441, 2.
- Veratroidia** = *Jervia* and resin, Bullock. xxiv, 363—prep. and prop., Mitchell. xxii, 405, 8, 415—fr. *Veratrum lobelianum*, Tobien. xxvi, 592, 3.
- Veratrum**, active principles of officinal, Mitchell. xxii, 397; xxiii, 130—alkaloids, physiolog. act., Mitchell. xxii, 418; history, Tobien. xxvi, 37, 591; Wright and Luff. xxvi, 593.
- Veratrum**, *ALBUM*, chemical history, Mitchell. xxii, 403, 412—alkaloid, Wormley. xxiv, 356; Weppen. xxi, 206—descript., Meyer. xxx, 149—germinat. of seeds, Saunders. xxx, 567—Japan, descript., Holmes. xxviii, 107—probably only a variety of *V. viride* and *vice versa* Maisch. xxii, 552.
- *CALIFORNICUM*;—*V. PIMBRIATUM*, California. xix, 307;—*V. FRIGIDUM*, Mexico. xxiv, 770;—*V. LOBELIANUM*, cont. *veratroidia* and *jervia*, Tobien. xxvi, 592;—*V. NIGRUM*, descript., Meyer. xxx, 149.
- *VIRIDE*, alkaloids. xxiv, 48, 356, 363—yield of constituents, Bullock. xxviii, 106—chemical history, Mitchell. xxii, 402—analysis (*veratridia*) Robbins. xxv, 439—history of examinat., Robbin. xxv, 439—analysis (*veratria*) Wormley. xxiv, 356—analysis of ash of root, Mitchell. xxii, 411—cont. *jervia*, Mitchell. xxii, 99—cont. no *veratria*, Bullock. xxiv, 363—fails to find *viridia*, Mitchell. xxii, 404—discussion. xxv, 523—is probably only a variety of *V. album* and *vice versa*, Maisch. xxii, 552.
- Verbascum**, flowers, loss in drying. xxi, 202.
- *BLATTARIA*, Kansas. xxix, 451;—*V. SINUATUM*, Morocco. xxiii, 149;—*V. THAPSUS*, Kansas. xxix, 451.
- Verbena BRACTEOSA**, Buntin. xxii, 108;—*V. HASTATA*, Kansas. xxix, 452;—*V. JAMAICENSIS*, Liberia. xxvii, 163;—*V. OFFICINALIS*, Malta. xxvi, 167;—*V. SPURIA*, Kansas. xxix, 452;—*V. SWEET*, Australia. xxviii, 100;—*V. TRI-PHYLLA*, Algeria. xxvi, 278;—*V. URTICIFOLIA*, Kansas. xxix, 452.
- Verbenaceæ**. xxii, 108; xxv, 141; xxvii, 163; xxviii, 126; of California. xix, 304; Kansas. xxix, 452; Mexico. xxiv, 772.
- Verbesina BOSVALLEA**, India. xxvii, 179;—*V. SINUATA*, Kansas. xxix, 443.
- Verdolaga**—*Portulaca oleracea*, Chili. xxiv, 765.
- Vermillion**, see also *CINNABAR*—act. of light, Heumanns. xxiii, 309—decomp. by mur. ac., Teuber. xxviii, 253—estimat., Gramp. xxiv, 262—manufact. in China, McCallum. xxx, 307—fr. corros. sublimate, Hausmann. xxiii, 309—fr. calomel, Raab. xxiii, 309—reduced by copper, Heumanns. xxiii, 309.
- Vernonia ANTHELMINTICA**, India. xxiv, 140;—*V. FASCICULATA*, Kansas. xxix, 443.
- Veronica**, loss in drying. xxi, 202.
- *AMERICANA*, California. xix, 304;—*V. PREGRINA*;—*V. VIRGINICA*, Kansas. xxix, 451.
- "**Vervain**," *JAMAICA*,—*Stachytarpheta jamaicensis*. xxvii, 163.
- *AMERICAN*—*Verbena hastata*;—*V. BLUE*,—*Verbena spuria*;—*V. WHITE*,—*Verbena urticifolia*, Kansas. xxix, 452.
- Vervena SILVESTRE**, Arg. Republ. xxiv, 762.
- Vesbium**, Scacchi. xxviii, 258.
- Vesicating insects**, Fumouze. xxii, 169. See also *BLISTERING BEETLES*.
- Vesiga**—dorsal chord of sturgeon, Russia. xxii, 172.
- Vetch**, amount of sugar in nectar, Wilson. xxvii, 442—cont. amygdalin and a body analogous to asparagin; Ritthausen and Kreusler. xix, 273 (depends on light, Piria. xxi, 256)—cont. zinc, Bellamy and Lechartier. xxvi, 400.
- **BITTER**—*Ervum ervilia*. xxviii, 187.
- Vial**, **PRESCRIPTION**, shape of lip. xxii, 516.
- Viasiga**—tendons of sturgeon, Russia. xxiv, 780.
- Viburnum**, spec., review, Maisch. xxvi, 241.
- *ACERIFOLIUM*;—*V. DAHURICUM*, Siberia;—*V. DENTATUM*;—*V. LANTANA*;—*V. NUDUM*;—*V. OBOVATUM*;—*V. ODORATISSIMUM*, China, account, etc., Maisch. xxvi, 242.
- *OPULUS*, Maisch. xxvi, 242—analysis, Chevreul, Dumas and others. xxvi, 243.

Viburnum, PRUNIFOLIUM, Maisch. xxvi, 242—adult. of powd. xxx, 576—analysis, Allen. xxix, 167.
—**SCABRELLUM**;—**V. TINUS**, France, account, Maisch, xxvi, 242.
Viburnina, fr. *Vib. opulus*, Krämer. xxvi, 244.
Vice Presidents, FIRST, since organization: xviii, 6; xix, 7; xx, 7; xxi, 7; xxii, 7; xxiii, 7; xxiv, 7; xxv, 6; xxvi, 6; xxvii, 6; xxviii, 6; xxix, 8; xxx, 6.
—**SECOND**, since organization. xviii, 6; xix, 8; xx, 8; xxi, 8; xxii, 8; xxiii, 8; xxiv, 8; xxv, 7; xxvi, 7; xxvii, 7; xxviii, 7; xxix, 9; xxx, 7.
—**THIRD**, since organization. xviii, 7; xix, 8; xx, 8; xxi, 8; xxii, 8; xxiii, 8; xxiv, 9; xxv, 8; xxvi, 8; xxvii, 8; xxix, 10; xxx, 8.
Vichy, **GRANULAR EFFERVESCENT SALT**, Mitchell. xxi, 179.
Vicia, see **VETCH**.
Vidriera, Arg. Republ. xxiv, 762.
Vieirina fr. *Remigia ferruginea*. xxvii, 182.
Villanovus, **Arnoldus**. xxv, 478.
Vinagrillo, Arg. Republ. xxiv, 763.
Vinca MAJOR;—**V. MINOR**, constituents, etymology, Martin. xxii, 110, 111;—**V. ROSEA**. xxii, 111; Mauritius. xxiv, 741.
Vindai=*Methonia superba*, India. xxvi, 158.
Vine leaves, physiolog. function, Macagno. xxvi, 258.
Vine, **BASTARD**;—**V. WILD** (=pareira). xix, 501.
Vinegar, see also **ACID, ACETIC**.
—act. of ferric chlor., Brown. xxvii, 486—adult. xxi, 488—contamin. (zinc acet.). xxiii, 525—drop equivalent, Talbot. xxix, 34—formation, Knierrim and Meyer. xxii, 250—detect. of free sulph. ac., Donath. xxviii, 212; King. xxi, 128.
—**ANTISEPTIC**, Pennés. xxvi, 90.
—**ESSENCE**. xxvii, 451.
Vino MAESTRO;—**V. TIerno** for Malaga wine. xxvi, 262.
Vinum, see **WINE**.
Viola, spec., contain salicylic ac., Mandelin. xxx, 234.
—**ARENARIA**;—**V. CANINA**, cont. salicyl. ac. xxx, 235;—**V. CUCULLATA**, Kansas. xxix, 452;—**V. FLORIBUNDA**;—**V. MIRABILIS**, contain no salicylic ac. xxx, 235;—**V. ODORATA**;—**V. PALUSTRIS**, cont. salicylic ac. xxx, 235;—**V. PEDUNCULATA**, California. xix, 299;—**V. PINNATIFIDA**, cont. no salicylic acid. xxx, 235;—**V. SYLVATICA**, cont. salicylic ac. xxx, 235.
—**TRICOLOR**, cont. salicylic ac. and tartrate magnesium, Mandelin. xxviii, 173—uses in Turkey. xxii, 133.
—**ULIGINOSA**;—**V. UNIFLORA**, cont. no salicylic ac. xxx, 235.
Violaceæ. xxii, 133; xxviii, 173; xxx, 234; of California. xix, 299; Kansas. xxix, 452.
Violet, cultivat., Australia. xxviii, 100; France. xxiv, 823; xxvii, 383.
—**MAGIC**,=*Vinca minor*. xxii, 111.
Viraró, Arg. Republ. xxiv, 764.
Vira-vira, Arg. Republ. xxiv, 763.
Virgin dip, **TURPENTINE**. xxvi, 327.
Virginia, exports and commodities to be had A. D. 1610, D. Hanbury. xix, 79, 493.
—pharmacy law. xix, 356.
Virginia snake root, see **SERPENTARIA**.
Viridia (of Bullock) not found by Mitchell. xxii, 410—seems to be identical with *jervia* (of Mitchell.). xxii, 418.
Viscol, Arg. Republ. xxiv, 763.
Viscose, fr. sugar, Bechamp. xxx, 368.
Viscum ALBUM, see also **MISTLETOE**—analysis of ash of *V. alb.* fr. poplar, locust and pine, Benton and Grandeau, xxvi, 245.
Vishamungil = *Crinum asiaticum*, India. xxix, 127.
Vitaceæ. xxi, 236; xxii, 138; xxiii, 196; xxiv, 170; xxv, 186; xxvi, 258; xxvii, 211; xxix, 196; xxx, 218; of California. xix, 300; Kansas. xxix, 452.
Vitellin, fr. seeds of *Lupinus varius*, Vines. xxviii, 366—cryst. fr. Para-nuts. xxviii, 356.
Vitex IRISCA, China. xxiv, 753;—**V. NEGUNDO**, India, descript., Dymock. xxv, 141;—**V. TRI-FOLIA**, India. xxv, 142.

Vitis ARIZONICA. xxvii, 311;—**V. CALIFORNICA**. xix, 300; xxvii, 211;—**V. LATIFOLIA**, India, descript., Dymock. xxv, 187.
Vogelbach, H. A. discussions. xxiv, 573, 574, 657, 658, 659, 660, 689, 690.
Vogeler, A. G. fruit syrups. xxviii, 434—syrup of licorice root. xxviii, 433.
—discussions. xxvii, 797; xxix, 508, 509, 511.
Voodoo rite, Haiti, Langston. xxvii, 159.
Vroumeenhair, Cape Good Hope. xxiv, 738.
Vulgago (VULGOGINA) A. D. 800—900 = *Asarum europæum*. xxviii, 465.

W.

Wafer, RED, cont. up to 9 p. c. red lead, Bernhart. xxii, 56.
Wafer ash, adult. of powd. xxx, 577.
Wafer capsules (CACHETS DE PAIN). xxiv, 31; Limousin. xxiii, 86; Lechler and Blair. xxiv, 96; McIntyre. xxiv, 95; Remington. xxiii, 614; Zwick. xxiv, 462; discussion. xxiv, 682—PRESS: Digne. xxvii, 102; McBoring. xxiv, 95; Rice. xxiv, 95; Studer, Jr. xxiii, 89—filler, Wharton. xxvi, 134—for oils and balsams, Limousin. xxvi, 134—solubility, Remington. xxiii, 621.
Wages for different trades, tables. xxii, 357.
Wagutty=*Capparis brevispina*, India. xxvi, 160.
Wahoo see **EUONYMUS ATROPURPUREUS**.
—adult. of powd. xxx, 577—analysis, Miller. xxvii, 265.
Waiwarung=fruit of *Embelia ribes*, India. xxv, 153.
Wakma=root of *Aconitum palmatum*, India. xxvi, 158.
Waldivin fr. *Simaba waldivia*, Tanret. xxix, 193.
Walker, **VINEGAR BITTERS**, Sharples. xxiii, 525—Eberbach. xxiii, 732.
Wallflower, cultivat. in Australia. xxviii, 100.
Wallnutt oyle, A. D. 1610. xix, 492.
Wall pepper see **SEDUM ACRE**.
Walling, W. H. Phosphorus pills. xxiii, 618.
Walnut see also **JUGLANS REGIA**—cont. regianin, Phipson. xix, 293.
—**CHINESE**. xxiv, 197;—**W. COUNTRY**,=Aleurites triloba, Jamaica. xxiv, 733.
Waltheria GLOMERATA, Matico, Panama. xxiii, 222, 646.
Walu=*Raphidophora vitiensis*, Fiji. xxx, 146.
Wanga=*Datura stramonium*, Haiti. xxvii, 159.
Wanglo=*Sesamum*, Jamaica. xxiv, 732.
Wanika = arrow poison fr. *Strophanthus spec.*, Africa. xxix, 116.
Warts, cautery. xix, 167.
Wash bottle, Foord. xxiii, 36—Johnson. xxvi, 79; xxx, 44—Treichman. xxvi, 79—Woodward. xxvi, 80.
Waskiza=*Euphorbia terracina*, Morocco. xxiii, 222.
Wasserholder=*Viburnum opulus*. xxvi, 242.
Water, see also **AQUA**—act. upon resin, gum resins, balsams, Hirschsohn. xxvi, 456—muddy, clarified, Fairthorne. xxix, 242; Kletzinski. xxiii, 238; Wilder. xxi, 141—color, Meyer. xxx, 259.—act. upon Fehling's test, Boivin and Loiseau. xxiii, 365—format. of fungi (phosphates indispensable), Frankland. xix, 263—freed of gypsum, Reinsch. xviii, 217—test for hardness (nitrophenic ac.). Langbeck. xxix, 241; Wartha. (logwood, mur. ac.). xxix, 241—hydrant, is often troublesome in mixtures, changing the color, Bernbeck. xxvi, 90—rendered INNOCUOUS by citric ac., Langfeldt. xxix, 242—detect. of iodine, Chatin. xxv, 246—source of NITRIC AC., Ekin. xix, 179; test for nitric ac., Boettger (brucia). xxiii, 420; Bolas (ferrous sulphate). xxii, 175; Donkin (carbolic and sulphur. ac.). xxii, 175; Ekin (iod. pot. and starch; naphthylamine). xxx, 263; Vogel (gold leaf, mur. ac.). xxiv, 209 detect. of organic matter, Fischer. xxiii, 239; Leffmann. xxx, 309—putridity prevented by metallic iron. xix, 166—act. of sugar in presence of sewage, Heinsch. xix, 262.
—**AERATED**, often contains lead. xxiii, 44.
Water, BITTER ALMOND, Koster. xxii, 62; Oster. xxiii, 44; Vielhaber. xxvii, 63; Zwick. xxix, 61—test, Oster (ammon. copper). xxi, 158—turbidity removed by dilut. sulph. ac. xxi, 159.

- Water, BORAX LAKE, comp.**, Moore. xviii, 228.
 — **CAMPHOR**, Hallberg (cold water). xxv, 60—Hartzell (ether). xxii, 60.
 — **CHERRY LAUREL**, for hypodermic solutions, Lutton. xxii, 64—strength variable according to time of collecting the leaves, Leger. xxii, 62—commercial, Woodland. xxix, 61—artificial, Rippling. xxv, 60.
 — **CHLORINE**, administr. best with simple syrup, Mylius. xxi, 159—extemporaneous. xviii, 220; Monroe. xxi, 159.
 — **CINNAMON**, deposit of cinnamic ac., prevented by carbon. ac. gas, Backhaus. xxii, 61—decomp. of acid, Enz. xxix, 62—distilled more agreeable than with oil, Reinhold, Jr. xxii, 61; discussion. xxiv, 685—oil of Ceylon cinnamon seldom used, Jones. xxiv, 485.
 — **DISTILLED**, freed fr. ammonia, Thomson. xxviii, 41—to keep, Squibb. xxi, 99—act upon Fehling's test, Bolvin and Loiseau. xxiii, 238—substituted by snow water, Labor. xxix, 61.
 — **DISTILLED**, concentrated of Ph. German, are benefited by redistillation, Dieterich. xxix, 61.
 — **BIDISTILLED**, Hager. xxviii, 41.
 — **EUCALYPTUS**. xxv, 60.
 — **GREAT SALT LAKE, comp.**, Bassett. xxii, 174.
 — **IODIZED**, Blackwell. xxvii, 65.
 — **KISSINGEN RAKOCZY**. xix, 486.
 — **LAVENDER** see also **LAVENDER WATER**—distilled, is better for the eyes than rose water, Delieux. xxi, 159.
 — **LIME**—strength varies according to temp. and quality of lime, Cox. xxvii, 333.
 — **MEDICATED U. S. PH.**, incompatible with alkalis, Owen; Maisch. xix, 107, 143—compared to distilled. xxii, 60—without magnesia, Reinhold, Jr. xxi, 158—diatomaceous earth, Markoe. xix, 107; xxi, 102—glycerin, Racher. xxiv, 63—paperpulp, Ruan. xxii, 60—silica, Sheppard. xix, 442—boiling water, Ebert. xix, 143; Hallberg. xxv, 59; Kennedy. xxv, 59—charcoal, Trout. xxv, 59.
 — **MINERAL** see also **SPRING, MINERAL**—analysis, incrustation during evaporation prevented by formic ac., Mohr. xix, 141—artificial, history, formula, Moith. xix, 483, 5; Rother. xix, 143; xxii, 64; oxidat. of iron prevented by sulphites, Hager. xviii, 218; reference to Hager's manual. xx, 66—of California. xxvii, 639—estimat. of carbonates, Chevalet. xviii, 218.
 — **MORPHINATED**, for opium assay, Teschemacher. xxv, 300.
 — **ORANGE FLOWER, adult.** (seawater and oil neroli), xxvii, 64—colored by nitric ac., Reynolds. xxvii, 64—distilled over naked fire keeps better than by steam, Vuastart and Machet. xxi, 158; xxiv, 64—in Greece. xxvii, 63.
 —, **OXYGENATED**, Regnard. xxix, 369.
 — **OZONIZED**, Behrens. xxi, 496.
 — **POMPTON (N. J.)**, cont. arsenic. xviii, 217.
 — **ROSE**, chalk and distil., Neynaber. xxvii, 65—keeps better if distilled over naked fire, than by steam, Vuastart and Machet. xxi, 158—manufact. in India, Douglass. xxvi, 282.
 — **SEA**—cont. lithium, Deulafast. xxvii, 332.
 — **SNOW**—, as subst. for distilled water, Labor. xxix, 61.
 — **SODA**, see **SODA WATER**—in California. xxvii, 639.
 — **TAR, sand**, Magnus-Lahens. xviii, 208—sawdust, Phar. Soc. Paris. xxvi, 111—concentrated, Pommier. xxii, 64—substitute (elatine), Ciutlini, xxx, 57.
Water avens, used by the Indians. xxi, 619.
Water-bath. xxv, 50—with constant level, Benjamin. xxvii, 52; xxviii, 35; Muencke. xxiii, 32; Weinhagen. xxvii, 53.
Water elder = *Viburnum opulus*. xxvi, 242.
Water glass, see **POTASSIUM SILICATE**.
Water-nymph = *Naja flexilis*, Kansas. xxix, 448.
Water-proof CLOTH. xxi, 198—**PAPER (wax)**. xix, 170; (ammon. sulph. copp.), Scoffern. xix, 171—**VARNISH**, Chinese. xix, 171.
Water shield = *Brasenia peltata*, Kansas. xxix, 448.
Wattle bark = *Acacia pycnantha*, Australia. xxix, 211.
Wattle, BLACK;—**W. SILVER**, = *Acacia decurrens*, California. xxvii, 599.
Wagh, George J. Discussion. xxiv, 761; xxv, 578.
Wa-upla-bij = seeds of *Luffa echinata*, India. xxvii, 228.
Wax (BEESWAX), see **WAX, WHITE** and **YELLOW**.
 — **"AMERICAN"** (of European commerce), fr. *Brosimum galactodendron*, Venezuela. xxvii, 274;—**ARAUCARIA**, sp. gr. Hager. xxvii, 424;—**BAHIA**, charact. test, Hirschsohn. xxviii, 292;—**BEECH**, Flückiger. xxiv, 307;—**BRAZIL**, see **WAX, CARNAUBA**;—fr. *BROSIMUM GALACTODENDRON*, Venezuela. xxvii, 274.
 — **CARNAUBA**, act. of chemicals, Guyot. xxv, 282—collection. xxvi, 184, 5—distinct. fr. myrtle wax, Guyot. xxv, 282—charact. test. xxviii, 292, 3—prop., xix, 308—solubilities, Sacc. xix, 310.
 — **CHARA**, see **WAX, CARNAUBA**;—**CERESIN**. xxiv, 398. See also **CERESIN**;—**CHINESE**, fr. *Ligustrum lucidum*. xxix, 305; see also **WAX, PELA**;—**HARTH**, see **OZOKERITE**;—**EGYPTIAN**, sp. gr., Dieterich. xxx, 363;—fr. *FICUS GUMMIFLUA*, Java, analysis, Kessel. xxvii, 268;—for **FLOWER-MAKERS**, Squibb. xxv, 544;—**IBOTA**, fr. *Ligustrum Ibota*, Japan. xxviii, 293.
 — **JAPAN**, fr. *Rhus vernicifera*, succedanea, sylvestris. xxviii, 294—account, xxiii, 218; xxiv, 193; xxvi, 295—composition (ought to be called "tallow"), Eurl. xxvii, 436—charact. test, Hirschsohn. xxviii, 292—melting point, Roucher. xxi, 257—spec. grav., Dieterich. xxx, 363; Hager. xxvii, 424—no advantage over beeswax, Close. xx, 223.
 — **KOGA**, fr. *Cinnamomum pedunculatum*, Japan. xxviii, 293;—**MINERAL**, see **OZOKERITE**; in Utah. xxvii, 378;—fr. *MYRICA CERIFERA*, see **WAX, MYRTLE**;—**MYRTLE**, act. of chemicals, Guyot. xxv, 282; distinct. fr. carnauba wax, Guyot. xxv, 282; charact. test, Hirschsohn. xxviii, 292, 3;—**PALM**, fr. *Ceroxylon andicola*, South America. xxviii, 293;—**PARAFFIN**, see **PARAFFIN**;—**PELA**, by *Coccus pela* on *Fraxinus chinensis*, China. xxviii, 293;—**PHOSPHORETTED** is better than phosph. resin. xxi, 553;—"ROD" = amorphous paraffin. xxx, 59;—fr. **STICK-LAC**, charact. test, Hirschsohn. xxviii, 292;—**VEGETABLE**, fr. *Myrica jalapensis*, Mexico. xxiv, 769; prop., Meyer. xxviii, 293.
 — **WHITE**, adult., Bedford. xxv, 444—pure too brittle for wax flowers, Bedford. xxv, 445—test of purity, Bedford. xxv, 446—sp. gr., Dieterich. xxx, 363; Hager. xxvii, 424—detect. of stearin. xxv, 446—sp. gr. test fallacious, Squibb. xxv, 543.
 — **YELLOW**, adult. xix, 311, 333; xxi, 487; xxiii, 232, 498 (black muck); xxiv, 408—bleaching (No. Carolina best), Bedford. xxv, 444—detect. of ceresin and paraffin, Buchner. xxvii, 435; Peltz. xxx, 363; Wagner. xxvii, 436—collection, Creighton. xxiv, 206—drug market. xx, 142; xxi, 450; xxiv, 397—detect. of Japan wax, Hager. xix, 311; Roussian. xix, 311—detect. of paraffin, Davies. xix, 311—test of purity, Becker. xxviii, 292; Buchner. xxviii, 293; Donath. xxi, 267—detect. of resin. xxiv, 206; Davies. xix, 312; Schmidt. xxvi, 503; xxvii, 434—behavior to reagents and solvents, Hirschsohn. xxviii, 291—soluble in eucalyptus oil, Osborne. xxvii, 234—sp. gr., Dieterich. xxx, 363; Hager. xxvii, 424—sp. gr. of adulterants, Dieterich. xxx, 363—charact. test, Hirschsohn. xxviii, 292.
Wax bush = *Cuphea viscosissima*, Kansas. xxix, 448.
Wax VARNISH, Koch. xix, 175.
Weather-map, GRAPHIC. xx, 308.
Weeks, E. J. Oil erigeron. xx, 242.
Weighing in analysis (half a mgm. near enough), Lawrence Smith. xxiii, 111.
Weights ALUMINIUM, Phipson. xix, 135.
 —, act. of barometric and thermometric influence, Mohr. xxvii, 27, 38—relation of **APOTHECARIES** to **METRIC** (proposes 15 to 1), Elliott. xxi, 579; difficulty solved, Maisch. xxv, 35; Fairbanks' weights. xxv, 569.

- Weights "NORMAL," alloy (iridn.) d.-lati** xxiii, 112; Matthey. xxvii, 376—reasons for adopting this alloy. xxvii, 28—glass proposed, Mohr. xxvii, 38.
- of U. S. Ph., Oldberg. xxi, 577; Taylor. xviii, 103—definite. xxvi, 678.
- Weinmannia RACEMOSA**, New Zealand. xxiv, 737; xxv, 365; — **W. TRICHOSPERMA**, Chili. xxiv, 765.
- Weldon mud** = regenerated oxide of manganese. xxx, 316.
- Wellcome, H. S.** Bromine production U. S. xxv, 448—discontinuance of exhibitions. xxv, 570—visit to cinchona regions. xxvii, 814.
- discussions: xxiii, 808; xxix, 658, 666, 669, 679, 682; xxv, 514, 517, 550, 558, 560, 564, 570, 571; xxvii, 790.
- Wells, J. D.** Report on exhibit. xxix, 307—senega. xxiv, 516.
- discussions. xxii, 500, 501, 502; xxiii, 754, 787; xxx, 628, 634, 636.
- Wenzell, W. T.** diluted alcohol. xxvii, 705—pharmacy in California. xviii, 198—phosphoric ac. xxx, 556—permanent reporter on progress of pharm. suggested. xix, 129—report on progress of pharmacy. xix, 129.
- West Virginia**, pharmacy law. xxix, 377, 391; xxx, 478, 495.
- Whall, J. S.** extr. quassia. xxii, 379—citrine ointment. xxiii, 635.
- Wharton, J. C.** emulsions. xxiv, 681—tinct. chlor. iron. xxiv, 676.
- discussion. xxiv, 618, 625, 642, 643, 656, 657, 660, 663, 666, 675, 676, 677, 678, 681, 683.
- Whawhako** = *Eugenia maire*, New Zealand. xxiv, 737.
- Wheat**, composition of pericarp and embryo, Church. xxv, 123—use of anthers (= flor. seliginis), Reiche. xxix, 120.
- **EGYPTIAN**, cont. baryta, Dworzak. xxiii, 126.
- Wheeler, C. Gilbert**, carbolic and nitric ac., xxiii, 700—pharmacy in So. America. xxiv, 441.
- discussion. xxiii, 824.
- Whey**, cont. kreatinln, Commaile. xviii, 267—preserved by chlor. iron, Almés. xxiv, 244—fermentation, Richet. xxvii, 461.
- Wheys**: **ALUM**; — **COMMON**; — **EFFERVESCING**; — **FERRATED**; — **MUSTARD**; — **SOUR**; — **TAMARIND**; — **VITRIOLATED**; — **WINE**. xxvii, 119.
- White, J. H.**, chloralhydrate as antiseptic. xxiii, 712.
- White gum tree** = *Eucalyptus gonicalyx*. xxi, 248; xxiv, 806.
- White precipitate**, see **MERCURY, AMMONIATED**.
- White rod** = *Viburnum nudum*. xxvi, 243.
- Whitfield, Thos.** discussion. xxvii, 790; xxviii, 565.
- Whiskey**, adult, xxv, 355—copper, does not come fr. the still, but fr. dirty measures, Starting. xxvii, 405—estimat. of methyl- and amyl-alcohols, Dupré. xxiv, 285.
- Whooping cough** (picrate ammonia). xxvii, 96.
- Wickham, W. H.**, report drug market. xxv, 344; xxvi, 645; xxvii, 549.
- Wiegand, Thos. S.**, Metric system. xxiv, 427—report executive committee. xviii, 22; xix, 37; xx, 30; xxi, 39; xxii, 468.
- discussion. xxiii, 753, 757; xxiv, 617.
- Wild cherry**, see also **PRUNUS VIRGINIANA**.
- adult. (sassafras bark), Maisch. xxii, 312—bitter principle, Williams. xxiii, 209—drug market. xxi, 450; xxii, 643; xxv, 335—cause of variation in color of infusion. Lemberger. xviii, 66; xix, 503—80 years ago. xxvi, 849—used by the Indians. xxi, 619.
- of **SOUTH CALIFORNIA** = *Cerasus demissa*. xxvii, 240.
- Wild r.** *H. M.*, iodoform. xxiii, 717.
- Wil's** ANTIPERIODIC fever and ague cure, analyzed, Churchill. xxiv, 417.
- Williams, Joseph**. Tartaric acid. xxiv, 542.
- Williamson, Peter**, xxiv, 630.
- Willow**, see also **SALIX**.
- **LEAVES**, p. c. of ash. xxii, 137—detect. of BARK in beer, Dragendorff. xxx, 339—cont. free lactic acid, Dott. xxvi, 311—constitut. of **LEAVES** and excrescences, Johansson. xxvii, 274—prop. of tannin, Johansson. xxvi, 555.
- Willow, MILK-**, = *Lythrum elatum*, Kansas. xxix, 448. — **WATER-**, = *Dianthera americana*, Kansas. xxix, 439.
- Wind bloom** = *Anemone virginica*, Kansas. xxix, 449.
- Wines**, acidity is due to malic and tartaric ac., Nessler. xxi, 236; xxiii, 196—estimat. of free acids, Roessler. xxx, 221; Schwackhoefer; Kissel. xxi, 237; adult. xxi, 238; detect., Nessler. xxiii, 196; Tuchschildt. xxi, 238—method of assay, Roessler. xxx, 220—estimat. of **ALC.** xxvi, 264—Roessler. xxx, 220; Tabarie. xxiv, 171—estimat. of **ALUM** and gyps., Louvet. xxx, 223—of **AMMONIUM**, Kalbrunner. xxi, 237—estimat. of **ASH**, Roessler. xxx, 221—estimat. of **EXTRACTIVE** matter, Eckels. xxviii, 82; Fuchs; Wittstein (hallymetric). xxvii, 401; Roessler. xxx, 220—estimat. of **GLYCERIN**, Borgmann, xxx, 256; Reichardt. xxvi, 265; Roessler. xxx, 221; Reynaud (of plastered wines). xxviii, 285—estimat. of **INOSITE**, Roessler. xxx, 222—detect. of **NITROGENOUS** compounds, Roessler. xxx, 221—estimat. of **PLASTERING**, Jay. xxx, 223—estimat. of **POTASH**, Kaiser. xxx, 223—relat. of pot. bitartr. to ash, Buchner. xxvii, 212—**PRESERVED**: Pasteur's reliable, Neubauer. xix, 163; xxi, 236; salicylic ac., Nessler. xxvi, 263—prop., Dudaux. xxiii, 196—estimat. of **SALICYLIC AC.**, Roessler. xxx, 222—determin. of **SP. GR.**, Roessler. xxx, 220—of **SUGAR**, Roessler. xxx, 221, 2—of free **SULPH. AC.**, Nessler. xxvi, 265; Roessler. xxx, 322—estimat. of **TANNIN**, Carpené. xxiv, 341; Gautier. xxvi, 556; Roessler. xxx, 221.
- **ARTIFICIAL**, Méné. xxii, 228.
- **RED**, causes of change to bitter, Neubauer. xxi, 236—clarified, Hopf. xxii, 228; Hoffmann. xxii, 195; Weigert. xxvii, 211—test for **ARTIF. COLOR**, Ambühl. xxix, 358; Calmberg (sulph. copper test fallacious). xxvi, 267; Chancel. xxvi, 266; Dupré (dialyze in jelly). xxvii, 213; Geissler. xxviii, 275; Hager (nitric ac. unreliable). xxi, 238; Nessler. xxvii, 213; Shuttleworth. xxii, 319; Stein. xxvi, 266; Stierlin. xxiv, 385; Sulzer. xxiv, 386—detect. of logwood, Lapeyrère. xix, 163; Pizzi. xxx, 222—obtaining oenolin, Varenne. xxvi, 625—test paper (œno-krine), Miller. xxvi, 267.
- and liquors, evils of exhibition. xix, 387.
- Wines AMERICAN**, analysis, Parsons. xxx, 200.
- **ANCIENT**, South France (A. D. 200), analysis, Berthelot. xxvi, 263.
- **AUSTRALIAN**, cont. iron, Wright. xxvi, 259.
- **CALIFORNIA**, analysis, Merrick. xxiv, 171—account. xxvii, 642, 655.
- **CHINESE**. xxii, 33.
- **ITALIAN**, analysis, dal Sic. xxii, 227.
- **MEDICATED**, drop equivalent, Talbot. xxix, 34—formula, Diehl. xxi, 139.
- **NIGHT-**, Greece. xxix, 317.
- **SPANISH**, adult. xxiii, 523.
- Wine, ALOES**, extract. matter, Eckels. xxviii, 82.
- **BEEF**, Gardner. xxviii, 450.
- **BEEF AND IRON**, Gardner. xxviii, 451.
- **BEEF, IRON AND CALISAYA**, Gardner. xxviii, 451.
- **BOLDO**, Verne. xxiii, 108.
- **CALISAYA**, Gardner. xxviii, 451.
- **CINCHONA**, Le Bœuf. xxiii, 108.
- **CINCHONA, FERRUGINOUS, LAROCHE**, analysis, Wittstein. xxiv, 420.
- **CINCHONA AND QUININE SALICYLATE**, Maury. xxiv, 110.
- **COCA**. xxv, 114.
- **COLCHICUM ROOT**, extractive matter, Eckels. xxviii, 82.
- **COLCHICUM SEED**, extractive matter, Eckels. xxviii, 82.
- **CONDURANGO**, Hoffmann. xxx, 126.
- **CREASOTE**, Tournier. xxvi, 496.
- **CYDONIAN**, Greece. xxvii, 241.
- **DIGESTIVE**, Schmidt. xxix, 107.
- **ERGOT**, extractive matter, Eckels. xxviii, 82.
- **IPECAC**, nature of precipitate, Duckworth; Attfield. xxi, 193—deposit contains emetia, Brownen. xxvii, 517—extractive matter, Eckels. xxviii, 82—prep., Barnes. xxix, 107.

Wine, IRON, BITTER, unoffic. formul. 1875. xxiii, 491—Gardner. xxviii, 451—Hancock. xxi, 123—Mitchell. xxii, 94—Moore. xix, 351.
 — **IRON, SWEET**, Gardner. xxviii, 452—Hancock. xxii, 342.
 — **LACTOPHOSPHATE LIME**, Watts. xxiv, 110.
 — **MADEIRA**, California. xxvii, 645.
 — **MALAGA**, account. xxvi, 261.
 — **MILLEPERS**. xxvi, 844.
 — **MYRRH**, Delion. xxi, 193.
 — **OPIUM**, extractive matter, Eckels. xxviii, 82—real strength, Shuttleworth. xxiv, 181.
 — **PEPSIN**, unoffic. form 1875. xxiii, 491—Gardner. xxviii, 448.
 — **PEPTONR**, Petit. xxx, 126.
 — **PITCH**, Greece. xxvi, 327.
 — **PORT**, adult., Bulwer. xxiii, 523—California. xxvii, 644.
 — **QUEBRACHO**, Burgos. xxviii, 85.
 — **RAISIN**, Leibach. xxii, 228.
 — **RENNET**, Selldin. xxiv, 109.
 — **RHUBARB**, extract. matter, Eckels. xxviii, 82.
 — **SALICYLIC**, Maury. xxiv, 110.
 — **SHERRY**, account, Francis. xxiv, 170—adult., Francis. xxiv 421—California. xxvii, 645.
 — **TAR** (sand, paper pulp), Fairthorne. xxix, 108—Heinitsh (magnesia). xxiv, 490—Moore. xxiii, 108.
 — **TOBACCO**, extract. matter, Eckels. xxviii, 82.
 — **WHITE ASH**, Wiegand. xxx, 126.
Wire apparatus, Hopkins. xxix, 54.
Wisconsin, pharmacy law. xxx, 479, 498.
Woad. xxiv, 714.
Wolf berry - *Symphoricarpos occidentalis*, Kansas. xxix, 441.
Wolfram, see **TUNGSTEN**.
 — (MINERAL) is tungstate of iron and manganese, Jean. xxiv, 254.
Womina mesi - *Patrinia scabiosæfolia*, Japan. xxviii, 150.
Wood, constituents. xxiii, 261.
 — section for **MICROSCOPE**, staining, Stiles. xxiv, 62.
 — **STAINING** (several colors), Leo. xxvi, 154, 5.
 — **WALNUT** color. xix, 168.
Wood, HAIR RESTORATIVE, analysis, Chandler. xviii, 215.
Wood, A. F. Discussion. xxvi, 884, 898, 910, 912.
Wood-apple GUM - fr. *Feronia elephantum*, India. xxiv, 718.
Wooden TAPS and faucets, cracks prevented. xix, 175.
Woodier gum - fr. *Odina woodier*, India. xxiv, 718.
Wool, act. of metallic ferricyanides, Bong. xxvi, 369 constituents of merino wool, Chevreul. xxvi, 534.
Wool fat (SUINTE) as source of benzoic ac., Taylor. xxvi, 534—cont. cholesterin, Schulze. xix, 351; xxii, 243—for product. of ferroc. pot. xxi, 287, 8.
Woolly butt = *Eucalyptus longifolia*, Australia. xxi, 249.
Woody - *Calophyllum inophyllum*, India. xxv, 184.
 — **CHA GOND** - resin of *Calophyllum inophyllum*, India. xxv, 184.
 — **CHR TFL** - seeds of the above, India. xxv, 184.
Wooray bally, source of curare poison, Brazil. xxvi, 215.
Worm weed - *Polanisia graveolens*, Kansas. xxix, 441.
Wormwood, see **ABSINTHIUM**.
Wourali (rari), see **CURARE**.
Wrack, see **FUCUS**.
Wright H. Jr., discussions. xviii, 72; xx, 52, 73, 101; xxii, 542.
Wrightia ANTIDYSENTERICA, constituents, Ram Chandra. xxx, 181—therapeutic value, Loll Dey. xxx, 181.
 — **TINCTORIA**, India, descript., Dymock. xxv, 150.
Wú-t'u—a spec. of aconite, China. xxix, 73.
Wyethia ANGUSTIFOLIA;—*W. GLABRA*, California. xix, 303;—*W. HELENIODES*, California. xix, 303; xxvi, 698; xxvii, 612.

X.

Xahxleh=*Papaver somniferum*, Malta. xxvi, 167.
Xanthin, fr. guano for producing caffen and theobromin, Fischer. xxx, 431.
Xanthium SPINOSUM, Maisch. xxv, 159—analysis, Guichard. xxv, 160; Yvon and Nocard. xxv, 161—analysis of ash, Godeffroy. xxv, 161—value in hydrophobia. xxv, 26 (denied by Yvon. xxv, 158)—in Chili. xxiv, 765; Kansas. xxix, 143.
Xanthium STRUMARIUM, China. xxiv, 757—Kansas. xxix, 443.
Xanthoprin, fr. santonin, Falk. xxvi, 613.
Xanthopuccina (in hydrastis) (—the third alkaloid of Hale and Burt), Lerchen. xxvii, 196.
Xanthorhamnin in buckthorn berries, Liebermann and Hörmann. xxvii, 264.
Xanthorrhoea resins, review, Maisch. xxix, 127—behavior to reagents, Hirschsohn. xxvi, 453-9.
Xanthorrhoea ARBOREA, resin yields picric ac., Wittstein. xxiv, 338.
Xanthoxylin (eclectic) solubility, Parker. xxx, 128.
Xanthoxylum, see also **PRICKLY ASH**.
 — **AMERICANUM**, Kansas. xxix, 450;—**X. CAROLINIANUM**, analysis, Colton. xxviii, 168;—**X. COCO**, Arg. Republ. xxx, 168;—**X. ELEGANS** (*jaborandi*), Brazil. xxiv, 162;—**X. PECKOLTIANUM**, analysis, Peckolt. xxiv, 165;—**X. PENTANOME**, Mexico. xxiv, 777;—**X. PIPERITUM**, Japan. xxiii, 120; Turkestan. xxi, 256;—**X. RHETSA**;—**X. TRIPHYLLUM**, India, descript., Dymock. xxv, 180.
Xochicopal - fr. *Amyris lignaloes*, Mexico. xxiv, 768.
Xum Bessie, Cape Good Hope. xxiv, 738.
Xylindein, fr. decayed wood, Liebermann. xxiii, 459; xxiv, 384.
Xylopia LONGIFOLIA, Brazil, constituents, Haenau. xxvi, 250.

Y.

Yaba bark, Central America, descript., chem. examin., Dondé. xxviii, 200.
Yabina, Dondé. xxviii, 200.
Yaguarundi = *Piper jaborandi*, Brazil. xxiii, 188.
Yak - medicinal (Japanese). xxviii, 111.
Yallhoy=*Monnina polystachya*, Brazil. xxvii, 218.
Yam, wild, adult. of powd. xxx, 577.
Yama-no-imo *Dioscorea japonica*, Japan. xxviii, 111.
Yama-rakkyo=*Allium senescens*, Japan. xxviii, 109.
Yareta, Arg. Republ. xxiv, 763.
Yarilla, Arg. Republ. xxiv, 762—**Y. HEMBRA** and **Y. MACHO**. xxiv, 761, 2.
Yarrow, loss in drying. xxi, 202—in California. xxvii, 613.
Yaupon: *Ilex cassine*. xxiv, 260.
"Y B" of Marignac=Samarium of Boisbaudran. xxix, 262.
Yeast, studies, Pasteur. xxiii, 466; Traube. xxiii, 465—act. of Rochelle salt, Hayduck. xxx, 452—adult. xxx, 452—ANALYSIS, Mitscherlich, Schlossberger, Liebig. xviii, 246; Nægeli and Loew. xxvii, 539; Schützenberger and Destreen. xxvii, 540—alcoholic, prep., Traube. xxvi, 630—assimilates ammonia, Griessmayer. xxi, 402—COMPRESSED. examin., Geiseler. xxx, 455; prep. xxvii, 540; Divis. xxiii, 467—FERMENTATION, Hayduck; Delbrück; Geiseler. xxx, 452—fermentative act. destroyed by corros. sublimate, Petit. xxi, 400; is not destroyed by +212° F. nor by—171° F., Schumacher. xxiii, 466; destroyed by borax, Dumas. xxi, 400 (denied by Petit. xxi, 400); not destroyed by silicate sod.; sulph. iron; sulph. cop.; arsenic; oxal. ac., acet. ac., Petit. xxi, 400—germs reside in the external integument of the grape berries, Pasteur. xxi, 402—prevents react. of iodine on starch, Wiesner. xxix, 368—preserved dry, Jeversen and Boldt. xxii, 287—detect. of starch, Wiesner. xxix, 369—TEMPERATURE necessary, Werner; Krüger, Delbrück; Rainer. xxx, 453, 4.
Yeast powder, California. xxvii, 646.

Yebisugusu=*Cassia tora*, Japan. xxviii, 186.

Yella=*Terminalia bellerica*, India. xxv, 203; xxvii, 233.

— **CHA GOND**=gum of above. xxv, 203.

Yellow resin tree=*Acaroid tree*, Australia. xxx, 148.

Yellow, THALLIUM-, Salter. xxvi, 423.

Ye-no-abura=*Perilla ocimoides*, Japan. xxvi, 296.

Yerba del ANGEL=*Eupatorium collinum*, Mexico. xxiv, 775.

— **BUENA**, Arg. Republ. xxiv, 762, 3:—=*Micromeria Douglassii*, California. xxvi, 698; xxvii, 164, 613.

— **del CIERVO**, Arg. Republ. xxiv, 763, 4.

— **CRINOIDES**, Chili. xxiv, 765.

— **DULCE**=*Lippia graveolens*, Mexico. xxiv, 772.

— **del GATO**=*Valeriana maxima*, Mexico. xxiv, 775.

— **de la GOLONDRINA**=*Euphorbia maculata*, Mexico. xxiv, 771.

— **del INCORDIO**, Chili. xxiv, 765.

— **del INDIO**=*Aristolochia foetida*, Mexico. xxiv, 771.

— **del LAGARTO**=*Polytrichum coriaceum*, Chili. xxiv, 766.

— **del LEON**, Arg. Republ. xxiv, 762.

— **LOZA**=*Mertensia pedalis*, Chili. xxiv, 765.

— **MANSA (ZA)**=*Anemopsis californica*, California. xxvii, 284; xxviii, 103—=*Megarrhiza californica*, California. xxvii, 613.

— **MARRA**=*Megarrhiza californica*, California. xxvii, 613.

— **MEONA**, Arg. Republ. xxiv, 762.

— **MORA**, Arg. Republ. xxiv, 762—=*Solanum nigrum*, Chili. xxiv, 765.

— **del NEGRO**, Mexico. xxiv, 777.

— **del PASTOR**=*Acalepha prunifolia*, Mexico. xxiv, 771.

— **PELUDA**, Arg. Republ. xxiv, 761.

— **de la PERDIZ**, Arg. Republ. xxiv, 764.

— **del PLATERO**, Arg. Republ. xxiv, 762.

— **del POLLO**, Arg. Republ. xxiv, 762, 3—=*Comelina tuberosa*, Mexico. xxiv, 770.

— **de la PUEBLA**=*Senecio canicida*, Mexico. xxiv, 775.

— **REUMA**=*Frankenia grandifolia*, California. xxvi, 698; xxvii, 613.

— **SANTA**=*Eriodictyon californicum*, California, account, Wellcome. xxiv, 134; xxv, 352; xxvi, 698; xxvii, 336, 9, 613; xxix, 141.

— **del VENADO**, Arg. Republ. xxiv, 763.

— **de la VIBORA**, Arg. Republ. xxiv, 763, 4.

— **de la VIRGEN**, Arg. Republ. xxiv, 761.

— **de ZAPO**, Arg. Republ. xxiv, 664.

— **del ZORILLO**=*Croton dioicus*, Mexico. xxiv, 771.

Yesgos=*Urtica mexicana*, Mexico. xxiv, 770.

Yew, see **TAXUS BACCATA**.

Ylang-ylang, see also **UNONA ODORATISSIMA**—descript., Flückiger. xxix, 189.

Yoh=leaves (Japanese). xxviii, 99.

Yoyote=*Thevetia icotli*, Mexico. xxiv, 773.

Ytterbia, prop., Marignac. xxvii, 343; Wilson. xxix, 261.

Ytterbium, spectrum; atomic weight, etc., Wilson. xxix, 261—fluorescence of salts, Soret. xxvii, 346.

Yttria, equivalent; spectrum, Delafontaine. xxvii, 343.

Yttrium (10), salts, Cleve. xviii, 284—fluorescence of salts, Soret. xxvii, 346.

Yucca ANGUSTIFOLIA, Utah. xxvii, 142;—**Y. BACCATA**, New Mexico. xxvii, 141;—**Y. BREVI-FOLIA**, California. xxvii, 141;—**Y. DRACONIS**, California. xxvii, 634;—**Y. WHIPPLEI**, California. xxvii, 142.

Yuyo amarillo, Arg. Republ. xxiv, 762.

Z.

Zaitoun-Yaghi=olive oil, Turkey. xxv, 140.

Zampa, Arg. Republ. xxiv, 762.

Zanaloin, Tilden. xxiv, 378.

Zapote borracho=*Lucuma salicifolia*, Mexico. xxiv, 774.

Zararihe (hul)-hindi=*Mylabris cichorei*, Arabia. xx, 249.

Zarawand-i-gird=*Aristolochia rotunda*, Persia. xxviii, 116.

Zarawand-i-tawil=*Aristolochia longa*, Persia. xxviii, 116.

Zarwand-i-gird=tuber of *Pinilia tuberifera*, India. xxvi, 161.

Zarza BLANCA, Arg. Republ. xxiv, 762, 4.

— **COLORADA**, Arg. Republ. xxiv, 764.

Zatheré, Arabia. xxiv, 780.

Zea mays, see **MAYS**.

Zedoary, Turkestan. xxi, 209.

Zellhoefer, George. Bonjean's ergotin. xxv, 404.

Zeni-avi=*Malva sylvestris*, Japan. xxviii, 168, 9.

Zerechtit=*Ubyza Schimper*, Abyssinia. xxvi, 228.

Z'herbe puante=*Cassia occidentalis*, Martinique. xxix, 209.

Zieria LANCEOLATA, Australia, yield of oil. xxi, 235.

Zietriskite, Utah. xxvii, 378.

Zinc. xviii, 237; xix, 206; xxi, 203; xxii, 198; xxiii, 296; xxiv, 249; xxv, 261; xxvi, 399; xxvii, 354; xxix, 267; xxx, 298.

— act. of nitric ac., Acworth. xxiv, 209; on nitric ac., Acworth and Armstrong. xxvi, 343—convenient form for analysis, Mann. xxx, 298—presence in animals and plants, Bellamy and Lechartier. xxvi, 399—fr. blende. xxvii, 354—often cont. sulphur, Wagner. xxx, 298—forensic detection, Chapuis. xxvii, 354—ores, assay, Mascazzini and Parodi. xxvi, 400—black patina, Neumann. xviii, 237—preferable to brass for physical instruments. xviii, 237—plating, Boettger. xxv, 58—salts, act. of trimethylamine, Vincent. xxv, 315—influence upon vegetation, Freytag. xix, 207—containers for vegetable subst. are often corroded, Nessler. xxx, 56.

— **ACETATE** (only two molecules water), Franchimont. xxviii, 306—fluid volume, Candidus. xxvii, 709—dissolves sulphate of lead. xxii, 200—soluble in alcohol, Candidus. xxx, 565.

— **AMIDOSULPHONATE**, Berglund. xxvii, 331.

— **ARSENIDE**, Deschamp. xxvii, 367.

— **BROMIDE**. xxviii, 222.

— **CARBONATE**, adult. xxi, 500.

— **CHLORIDE**, of test for alkaloids, Jorisson. xxix, 267—prep. Martenson. xxi, 299—reduced by magnesium. xix, 205—soluble in anhydrous ether, Skey. xxvi, 477.

— **DICHLOROPROPIONATE**, Backunts and Otto. xxvi, 534.

— **HYPOCHLORITE**, solut., Fairthorne. xxix, 79.

— **ISOVALERIANATE**, Schmidt. xxvii, 457.

— **LACTATE**, Brown. xxix, 313.

— and **MAGNESIUM CHLORIDE**, Warner. xxii, 198.

— **NITRATE** in pencils. xxiv, 71.

— **OLEATE**, Gerrard. xxi, 348—Wolff. xxvii, 430.

— **OLEO-PALMITATE**, Wolff. xxx, 360.

— **OXIDE**, contamin. with sulphite, Stoddard. xxvi, 400—crystals, Brügelmann. xxvii, 354—precipitation vs. combustion, Reynolds. xxx, 298—temperature of reduct. by hydrogen, Müller. xix, 138.

— **PERMANGANATE**, commercial, Biel. xxix, 268—prep. Martenson. xxi, 298; Stolba. xxv, 262—sp. gr. table of solut., Biel. xxix, 268.

— **PHOSPHIDE**. xxiv, 42—commercial (cont. much oxide and phosphate), Vigier. xxiv, 249—prep., Phar. Soc. Paris. xxvi, 400; Proust. xix, 207.

— **SALICYLATE**, prep., Hager. xxvii, 466; Vigier. xxvi, 542; xxvii, 466—prop., Vulpius. xxvii, 467.

— **SELENIDE**, Marcottet. xxvi, 351.

— **SULPHATE**, fluid volume, Candidus. xxvii, 709; xxviii, 420—test for iron, Mylius. xxix, 268; freed of iron, Jandous. xxi, 303—pill, excipient (manna), Fairthorne. xxx, 101—purified, Stolba. xxv, 261—solubility in alc., Candidus. xxx, 565.

— **SULPHITE**, Tichborne. xix, 206.

— **SULPHO-CARBOLATE**, Hager. xviii, 250; Hustwick. xix, 251; Lyons. xix, 207.

— **SULPHO-CHROMITE**, Gräger. xxx, 297.

— **SULPHOCYANIDE**, soluble in anhydrous ether, Skey. xxvi, 477.

— **TARTRATE**, Ficinus. xxvii, 469.

— **TELLURIDE**, Marcottet. xxvi, 407.

Zincilla, Arg. Republ. xxiv, 761.

Zingiber, see also **GINGER**.

— **CASSUMUNAR**, India, descript., Dymock. xxviii,

Zingiber (*Continued*).

- 114;—**Z. MACROSTACHYUM**, India, descript., Dy-
mock. xxv, 128.
Zirconium, salts, act. of trimethylamine, Vincent.
xxv, 315—fluorescence of salt, Soret. xxvii, 346.
Zizyphus Jujuba, India. xxviii, 195;—**Z. MISTOL**,
Arg. Republ. xxx, 138.
Zoapatle=*Montanea tomentosa*, Mexico. xxiv, 774.

Zume, Arg. Republ. xxiv, 763.

Zwick, G. A. Cachets de pain. xxiv, 462.

Zygadenus PANICULATUS, bulbs poisonous, Jones.
xxx, 148.

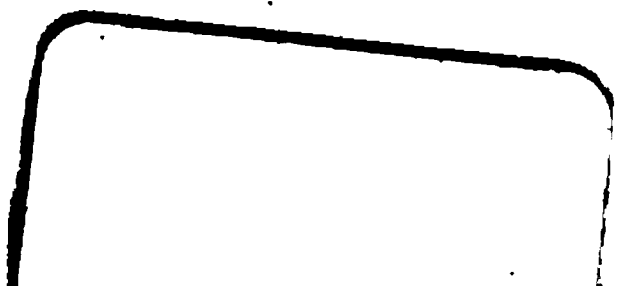
Zygophyllaceæ. xxi, 233; xxii, 132; of Mexico.
xxiv, 777.

Zyophyllum TARAGO, Mexico. xxiv, 777.

ERRATA.

<i>Page.</i>	<i>Column.</i>	<i>Line.</i>
4	1	33 from top. Stevenson read Stevenin.
10	1	16 from bottom. 550 read 555.
13	1	26 from bottom. Galippo read Galippe.
14	2	10 from top. xxvii read xxvi.
16	2	12 from top. Eisbrodt read Einbrodt.
16	2	13 from top. Holder— read Modder—.
17	1	40 from top. Add: 284.
17	2	19 from top. Add: see SEMECARPUS.
17	2	32 from top. xxiv read xxvi.
28	1	32 from bottom. Add: see VESICATING INSECTS.
35	1	49 from top. oudemans read Oudemans.
35	2	39 from top. Insert: — VENICOSA, Chili, xxiv. 766.
48	1	24 from bottom xxx. 615 read xxiii. 434.
54	1	19 from top. Insert: — PRIORITY (Maisch, Procter, Squibb), xxi. 82, 3.
58	1	27 from bottom. Insert: Emetic, SILVER see SILVER EMETIC.
58	2	33 from bottom. Add: see MIXTURE.
59	2	29 from top. Add: xxv. 352.
60	2	17 from top. Paterno read Paterrio.
78	2	17 from top. CETRARIA — SUGAR read CETRARIA. — SUGAR.
82	1	23 from top. Corne read Come.
88	1	11 from top. Koymyss read Koumyss.
117	1	31 from bottom. Paperveraceæ read Papaveraceæ.
138	1	20 from bottom. QUINIA read QUININE.
150	1	14 from top. 251 read 231.
151	1	33 from bottom. Salmi read Selmi.
55	1	36 from bottom. Seleni read Selmi.
159	1	6 from top. Starke read Stærke.
173	1	9 from bottom. Insert: <i>Zamia integrifolia</i> , Florida, xxvii. 280.

1 gal
25-9 +



1 gal
25-9 +

